B

Appendix B: Updated Technical Studies

The following technical reports cannot fully conform to AODA accessibility standards. For any accessibility requests, please contact Project Manager, Taylor Burke at tburke@kawarthalakes.ca or (705)324-9411.

The Corporation of the City of Kawartha Lakes

COLBORNE STREET BRIDGE

+ ENVIRONMENTAL IMPACT STATEMENT

CIMA+ file number: B001592
06 March 2026 – Review 001

The Corporation of the City of Kawartha Lakes

COLBORNE STREET BRIDGE

ENVIRONMENTAL IMPACT STATEMENT

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Register of issues			
Issue No.	Reviewed by	Date	Description of the review
001	N. Allen	2026-03-10	First Revision

Confidentiality and ownership

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List of Acronyms and Definitions

ANSI	Area of Natural and Scientific Interest
ARA	Aquatic Resource Area
BAG	Butternut Assessment Guidelines
CASAR	Canadian Aquatic Species at Risk
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
DBH	Diameter-at-breast Height
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EIS	Environmental Impact Study
ELC	Ecological Land Classification
ESA	*Endangered Species Act, 2007*(Provincial)
FWCA	*Fish and Wildlife Conservation Act, 1997* (Provincial)
GBIF	Global Biodiversity Information Centre
GHD	General Habitat Descriptions
GPS	Global Positioning System
IBA	Important Bird Area
LSW	Locally Significant Wetland
NAD 83	North American Datum 1983
LIO	Land Information Ontario
MBCA	*Migratory Bird Convention Act, 1994* (Federal)
MECP	Ministry of Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
MTO	Ministry of Transportation of Ontario
NHIC	Natural Heritage Information Centre
OBBA	Ontario Breeding Bird Atlas
OMNR/MNRF	Ontario Ministry of Natural Resources (old name for MECP) Ministry of Natural Resources and Forestry (old name for MECP)
OP	Official Plan
ORAA	Ontario Reptile and Amphibian Atlas
OWES	Ontario Wetland Evaluation System
PPS	Provincial Planning Statement
PSW	Provincially Significant Wetland
SAR	Species at Risk (in this report they refer to species that are provincially or federally listed as endangered or threatened and receive protection under ESA or SARA)
SARA	*Species at Risk Act* (Federal)
SWH	Significant Wildlife Habitat
UTM	Universal Transverse Mercator

SRANK Definitions

S1 Critically Imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure; uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure; Common, widespread, and abundant in the nation or state/province.

? Inexact Numeric Rank—Denotes inexact numeric rank

SNA Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

S#B Breeding

S#N Non-Breeding

SARA Status Definitions

END Endangered: a wildlife species facing imminent extirpation or extinction.

THR Threatened: a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

SC Special Concern: a wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

SARO Status Definitions

END Endangered: A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened: A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern: A species with characteristics that make it sensitive to human activities or natural events.

1. Introduction

CIMA+ was retained by the City of Kawartha Lakes (City), for the detailed design of the Colborne Street Bridge in the Town of Lindsay (The "Project"). This Environmental Impact Statement (EIS) was completed to assess the Project's potential to impact natural heritage features protected under other applicable legislative requirements.

1.1 Project Location

The Project location is defined as the area where changes or disturbances will occur related to the Project (e.g., construction, operation, and maintenance) and is hereinafter referred to as the "Site". The Site consists of a future Scugog River crossing located within the Colborne Street right-of-way and is located within part of Lot 21, and Lot 22, Concession 5, and part of Lot 21, and Lot 22, Concession 6, in the Geographic Township of Ops, in Lindsay, Ontario (UTM 17T 680258 m E, 4914468 m N) (Figure 1). The Site is bound by William Street to the west, the Scugog River to the North and South, and Lindsay Street to the East. The Adjacent Lands are provincial, and while the waterway is under Federal Parks jurisdiction, it has been determined that the Federal Environmental Assessment (EA) process does not need to be implicated for this project.

1.2 Project Description

The Project is a 77-m clear-span bridge with no piers or abutments in the Scugog River waterbody. A new access to the lower portion of Colborne Street West will be constructed to join with William Street in order to meet sightline requirements of the bridge. A slight realignment to Colborne St. E. will also be necessary to accommodate the new intersection of Colborne and Linsday Streets (and associated infrastructure). The construction of the bridge and associated roadway is proposed to occur between 2025 and 2027.

1.3 Purpose and Scope of Assessment

The purpose of this EIS is to address the design requirements by collecting and evaluating the available information from background review and site investigations. Using these data, the functions, and values of the natural features within the Site and the Adjacent Lands (i.e., Site + 120 m) are assessed, followed by an evaluation of significance as per applicable legislative requirements and guidelines. The report concludes with recommendations on avoidance and mitigations to protect natural features from impacts and to minimize any negative impacts.

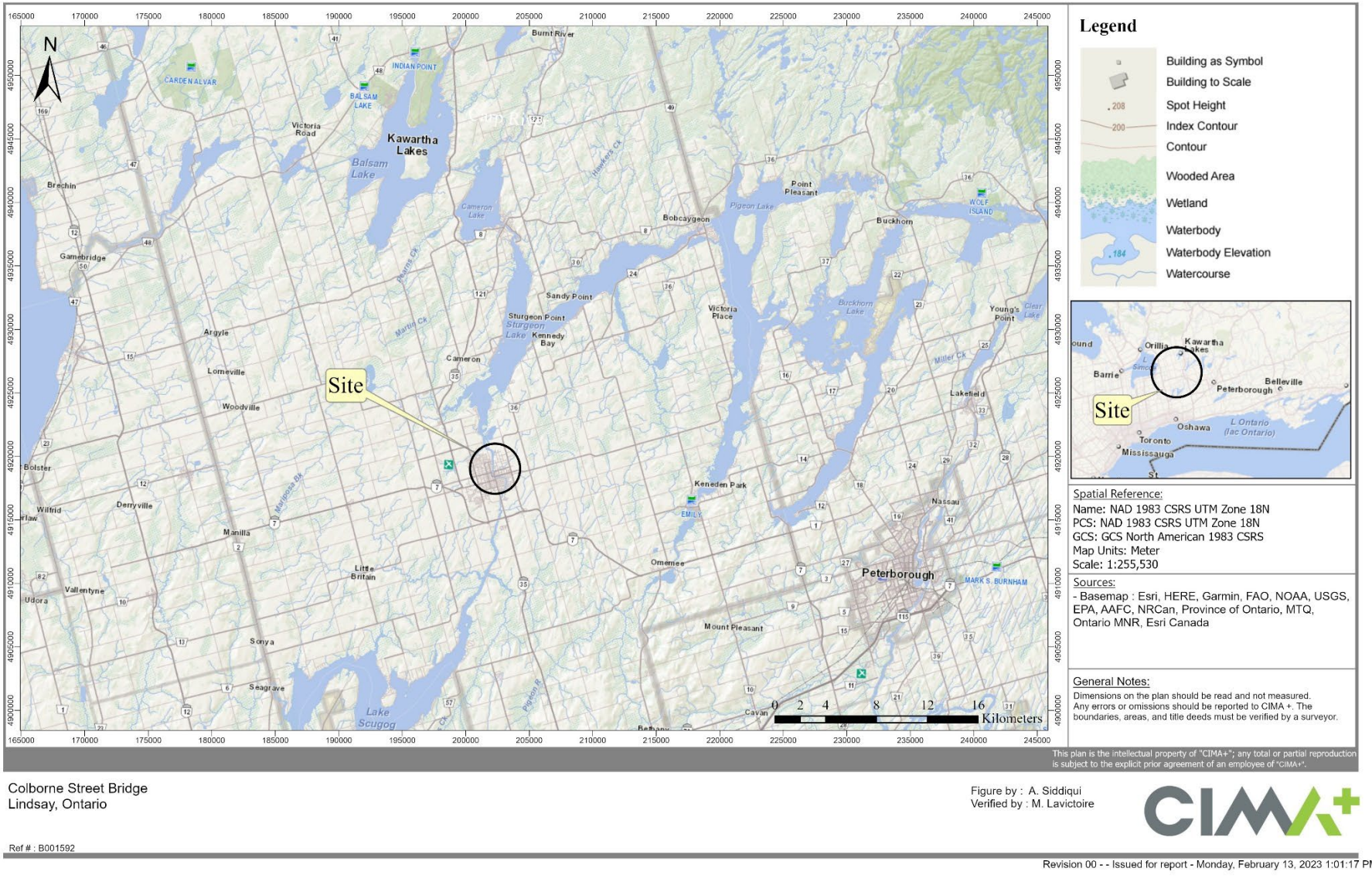

Figure 1: General Location of Site

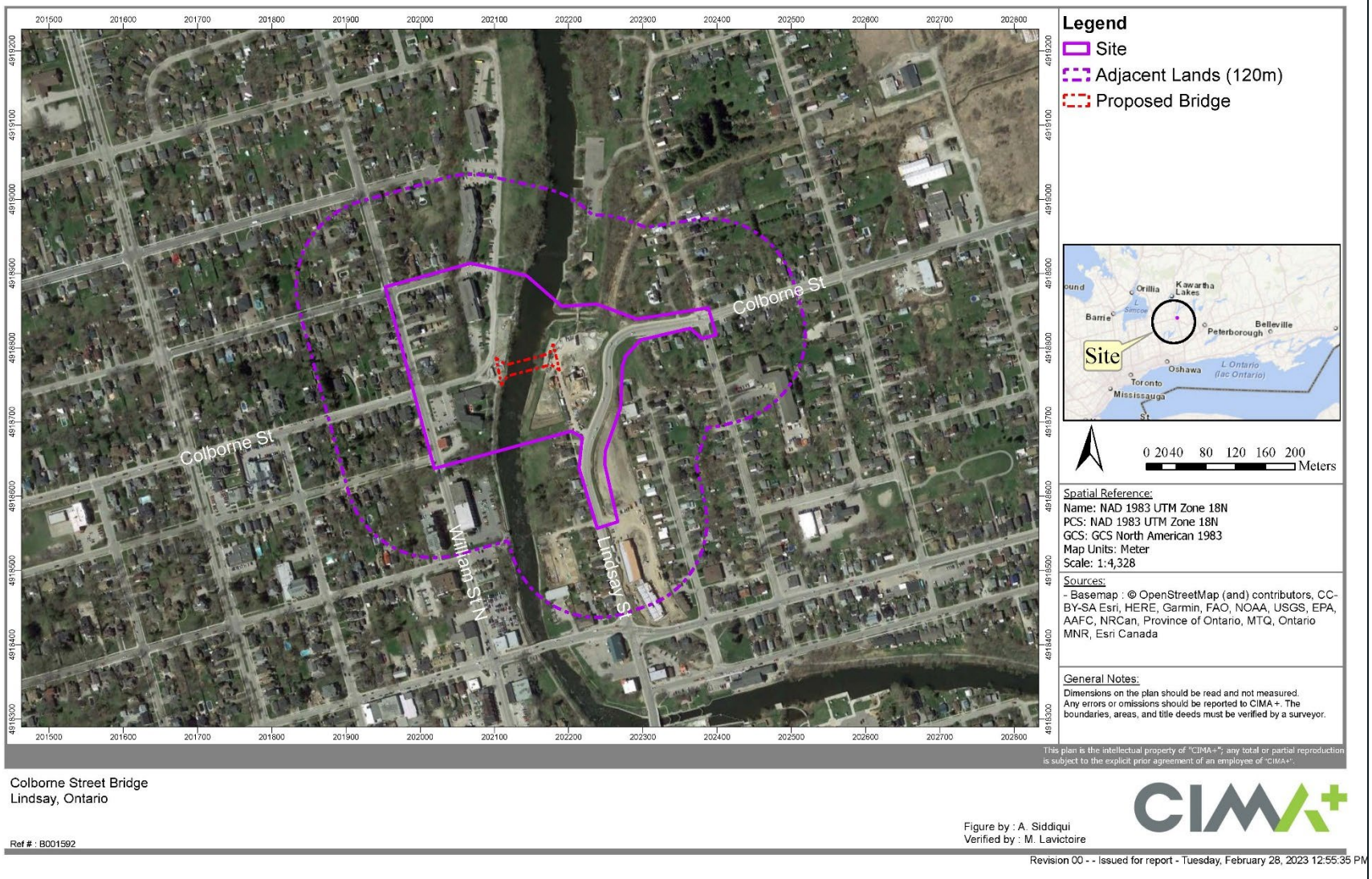

Figure 2: Project Area and Adjacent Lands (120 m)

2. Legislative Context

This section provides a summary of the relevant regional, provincial and federal acts, regulations, and policies that apply to the proposed works with respect to natural heritage features. It provides a brief description of the implications these may have for the construction of the infrastructure.

2.1 Federal

2.1.1 Fisheries Act

The *Fisheries Act, 1985,* last amended on August 28, 2019, is administered by Fisheries and Oceans Canada (DFO) and is intended to provide a framework for the management of threats to fish and fish habitat, including the prevention of pollution, regardless of their attachment to a fishery. The most relevant sections to works, undertakings and activities are:

- Prohibition of the Death of Fish (Section 34.4 (1));
- Prohibition of the Harmful alteration, disruption, or destruction of Fish Habitat (Section 35 (1)); and
- The provisional Ministerial powers to ensure the free passage of fish or the protection of fish or fish habitat with respect to existing obstructions (Section 34.3).

2.1.2 Migratory Birds Convention Act

The *Migratory Birds Convention Act*, 1994 (MBCA) regulates the protection and conservation of migratory birds as populations and individuals. It also offers protection for nests containing a live bird or viable eggs for most migratory bird species. Schedule 1 under the Migratory Bird Regulations (2022) lists 18 species that may reuse nests and whose nests are protected year-round regardless of occupation, unless the nest has been reported and deemed abandoned after a waiting period. Species listed under Schedule 1 that occur in Ontario include great egret, great blue heron, cattle egret, green heron, snowy egret, black-crowned night heron, and pileated woodpecker. The *Migratory Bird Regulations* (2022) prohibits the disturbance, damage, or destruction of migratory bird nests or eggs. These prohibitions and regulations apply to any areas where migratory birds and their nests are found in Canada.

2.1.3 Species at Risk Act

Federally protected species are listed in 'Schedule 1' of the *Species at Risk Act, 2002* (SARA). The application of SARA varies depending on the species and the level of government with jurisdiction over the land. In general, the relevant sections are:

- Prohibition of killing, harming, harassment, capturing or taking of an individual listed as extirpated, endangered, or threatened (Section 32(1))
- Prohibition of possessing, collecting, buying, selling, or trading an individual listed as extirpated, endangered, or threatened (Section 32(2))
- Prohibition against the damaging or destruction of residences of species listed as endangered or threatened. For extirpated species, the recovery strategy must also recommend the reintroduction of the species into the wild in Canada (Section 33)

However, on lands that are not federal, Sections 32 and 33 do not apply except for aquatic species (those listed as "fish" under the *Fisheries Act* or a migratory bird as per the MBCA, unless a federal order has been created.

2.2 Provincial

2.2.1 Endangered Species Act

The *Endangered Species Act, 2007* (ESA) prohibits killing or damaging the habitat of species that are listed on the Species at Risk (SAR) in Ontario list. Endangered (END) indicates that the species lives in the wild in Ontario but is facing imminent extinction or extirpation. Threatened (THR) indicates the species lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address the factors threatening it. Note that species listed as special concern are not afforded protection under the Act. The ESA is applicable on private and provincial lands. It can also sometimes be applicable to federal lands. The relevant sections to the Project are:

- Prohibition on killing or harming of END or THR individuals (Section 9)
- Prohibition on damage to END or THR habitat (Section 10)

2.2.2 Conservation Authorities Act

The Site is under the jurisdiction of Kawartha Conservation. On April 1, 2024, changes to the *Conservation Authorities Act,1990,* and a new regulation (O. Reg. 41/24) under the *Act* came into effect. Note that O.Reg. 41/24 (Prohibited Activities, Exemptions, and Permits) replaces all previous Conservation Authority development regulations.

2.2.3 Fish and Wildlife Conservation Act

In addition to the protections offered by the statutes and policies noted above, the *Fish and Wildlife Conservation Act, 1997* (FWCA), administered by the Ministry of Natural Resources and Forestry (MNRF), needs to be considered. This Act imposes restrictions on the hunting, trapping, and fishing of wildlife, as well as the possession of animals (live or dead). These restrictions include the capturing or harassing of specially protected wildlife or any wild bird species (not a game bird and not listed as an exception) regardless of its live stage (egg, adult) (Part II 5 (1)). It also protects nests or eggs of wild bird species (other than American crow, brown-headed cowbird, common grackle, house sparrow, red-winged blackbird, or starling) (Part II 7(1)). In case of conflicting provisions with the *Endangered Species Act*, the Act providing greater protection for the animal, invertebrate, or fish in question will prevail.

2.3 Municipal (Official Plans)

The provincial *Planning Act* (1990) provides the basis for land use planning in Ontario and the creation of Official Plans (OP). The entire Site and its Adjacent Lands are situated within the Town of Lindsay. Planning and development are subject to the Town of Lindsay Official Plan (2016). As the Town of Lindsay has limited natural heritage features within its geographic boundaries, the City of Kawartha Lakes Official Plan (2012) was also reviewed and has been included in the background review to assist in the identification of natural heritage features. This OP follows the guidelines set out in the *Provincial Planning Statement* (2024) (PPS). Note that while the guidelines are similar to the previous *Provincial Policy Statement* (2020), the latter was phased out on October 24, 2024. Regardless, the City of Kawartha Lakes OP identifies the following features contained within the natural heritage system:

- Wetlands.
- Fish habitat.
- Significant woodlands.
- Significant valleylands.
- Habitat of endangered and threatened species.
- Significant wildlife habitat; and
- Areas of Natural and Scientific Interest (ANSIs).

In addition, the Town of Lindsay OP identifies the following features:

- Hazard Lands.
- Environmentally Sensitive Features (i.e., Spawning Site and Water Supply).

The City of Kawartha Lakes OP illustrates environmental constraints on Schedule B3. There are none identified for the Town of Lindsay on Schedule B3 as the Town of Lindsay OP needs to be consulted to identify the natural heritage features for this area. Schedule D of the Town of Lindsay OP illustrates environmental constraints. These are all located adjacent to the Scugog River, Jennings Creek and Sinister Creek and display physical hazards and/or constraints.

As per the City of Kawartha Lakes OP (2012), an EIS is required to determine if natural heritage features have been designated in or adjacent to the site, followed by an assessment of the potential impacts to any identified natural heritage features from the proposed development. The City's natural heritage features are summarized in Table 1 below.

Table 1: Summary of Natural Heritage Features

Natural Heritage Feature	Reference to Official Plan
City of Kawartha Lakes	
Wetlands	Provincially Significant Wetlands (PSW), Locally Significant Wetlands (LSW), and unevaluated wetlands are identified on Schedule B of the City of Kawartha Lakes OP. OP Section 3.5.4 states that development and site alteration are "prohibited" in provincially significant wetlands. Any development or site alteration proposed on or adjacent to a LSW shall not occur unless it has been demonstrated that there will be no negative impact on the features or functions of the wetland or alternatively it has been demonstrated that there will be a net environmental gain to the satisfaction of the City. Section 3.5.5 states that an EIS shall be prepared for development within 120 m of a PSW or 30 m from an LSW. Section 3.5.7 states that where development is proposed within 120 m of an unevaluated wetland, the wetland shall be evaluated by a qualified person and submitted to the MNRF for approval to determine if it is a PSW. Once the significance is determined, the appropriate policies of this Plan apply.
Fish Habitat	OP Section 3.5.10 indicates that an EIS be prepared where development and site alteration proposals are within 120 metres of confirmed fish habitat. If fish habitat is present and may be altered, disrupted, or destroyed, the applicable agency (DFO) shall be consulted to determine if there could be Harmful Alteration, Disruption or Destruction of the fish habitat.
Significant Woodlands	Significant woodlands are generally identified on Schedule B as part of the Natural Heritage System. OP Section 3.5.18 states that development and site alteration in or within 120 metres of a significant woodland area may be permitted if it is demonstrated that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified. Note that Significant Woodlands are not mapped within the Town of Lindsay, where the jurisdiction becomes the Town of Lindsay OP.

Natural Heritage Feature	Reference to Official Plan
Significant valleylands	OP Section 3.5.24 indicates that development and site alteration may be permitted within or adjacent to (within 120 metres) significant valleylands if it is demonstrated by way of an EIS, that there will be no negative impacts on the natural features or on the ecological functions within the area identified.
Significant habitat of Endangered and Threatened Species (SAR)	The known Threatened and Endangered Species found within the City are catalogued by the MNRF Natural Heritage Information Centre (NHIC). OP Section 3.5.29 indicates that no new development or site alteration will be permitted within significant habitat of Threatened and Endangered Species. Any proposed development or site alteration in or adjacent (120 m) to natural heritage features is subject to an EIS in accordance with the City's guidelines.
Significant Wildlife Habitat (SWH)	Significant wildlife habitat including areas of seasonal concentrations, specialized habitats and habitats of special concern species are generally identified on Schedule B as part of the Natural Heritage System. OP Section 3.5.31 indicates that development and site alteration may only be permitted in areas identified as Significant Wildlife Habitat if it has been determined through an EIS that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified.
Areas of Natural and Scientific Interest (ANSI)	OP Section 3.5.35 indicates that development and site alteration may be permitted in ANSIs and areas adjacent to them within 50 m., for Earth Science ANSIs and 120m for Life Science ANSIs, if it can be demonstrated through an EIS that there will be no negative impacts on the features or functions for which the area is identified.
Town of Lindsay	
Hazard Lands	Hazard Lands are identified on Schedule D. OP Section 3.1.1 indicates that an EIS shall be prepared in accordance with the Plan for all development proposals on or abutting lands identified as Hazard Lands. Hazard Lands are subject to site plan control in accordance with Section 6.2.6 of the OP. The site plan shall correctly and precisely delineate those lands impacted by flooding or erosion and identify how the proposed development and/or redevelopment will ensure no damage or degradation to the environment through an EIS.
Environmentally Sensitive Features	Environmentally Sensitive Features are delineated on Schedule D. Section 3.1.2 identifies Environmentally Sensitive Features as spawning sites, water supply intakes or high sensitivity water use. An EIS in accordance with the Plan shall be required for all development proposals on or abutting areas identified as Environmentally Sensitive Features.

3. Methodology

3.1 Study Area

The "Site" includes the expected area of impact from the works associated with the construction of the bridge (Shown as a solid pink line on Figure 2). The "Adjacent Lands" herein are based on provincial guidance (i.e., those identified under the PPS, which is 120 m). When considering the potential for SAR to occur within the study area, a larger distance (5 km) is used to collect the background information. This is to account for species with large areas of habitat protections like some SAR birds and reptiles. Background Review

Where the OP indicated that the features to be considered were those identified on their schedules, these took precedence along with consultation comments from reviewing agencies. Other information collected from external sources was used to help inform the functions of these features and to identify those not found on the schedules (i.e., endangered and threatened species habitat). Information from government websites, other consultants' reports, and personal knowledge has also been included as appropriate. The desktop review included a larger area (~5 km), and the data were reviewed and analyzed for applicable site-specific information. Data sources included:

- Kawartha Lakes Official Plan (2012)
- Geographic information from Land Information Ontario (LIO, 2021)
- The Ministry of Natural Resources and Forestry's (MNRF) Natural Heritage Information Center (NHIC) Make A Map (NHIC, 2024).
- Ontario Breeding Bird Atlas 2 and Atlas-3 (Cadman et el., 2007, Bird Studies Canada, 2021-2025)
- Ontario Reptile and Amphibian Atlas (ORAA, 2019)
- iNaturalist (2022)
- eBird (2023)
- Important Bird and Biodiversity Areas (IBA, 2023)
- Global Biodiversity Information Facility (GBIF, 2023)
- Kawartha Conservation (2023)
- Fisheries and Oceans Aquatic Species at Risk Mapping (DFO, 2024)
- Aerial/Satellite Imagery (ESRI, 2024)

3.2 Field Studies

3.2.1 Vegetation Descriptions and Flora Observations

Vegetation communities were mapped using satellite imagery and verified during field visits. Field studies were completed by systematically walking the Project area. Field investigations included a botanical inventory, and vegetation was characterized based on the appropriate methodologies: Ontario Wetland Evaluation System, Southern Manual (OWES) (MNRF, 2022) for wetland habitats and the Ecological Land Classification for Southern Ontario (ELC) (Lee et al. 1998) for upland habitats. The MNRF's ELC and OWES definition of wetlands do not match one another. Since wetlands are to be evaluated following OWES, the determination of the presence/absence of wetland habitat was solely based on the OWES definition of wetland habitat:

> *"Lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface; in either case the presence of abundant water has caused the formation of hydric soils and has favored the dominance of either hydrophytic or water tolerant plants". (MNRF, 2022)*

Furthermore, OWES protocol notes that the presence of large numbers of obligate upland species requires an upland classification. As per OWES, the outer boundaries of the wetlands within the Project area were delineated and mapped using the "50% wetland vegetation rule" which estimates the relative abundance of wetland and upland species in each layer. Where access was permitted, our OWES qualified professional walked the outer limits of the wetland, using a hand-held Global Positioning System (GPS), to create a boundary line. As per OWES, the minimum community size to be delineated is 0.5 ha and the minimum wetland size to be assessed is 2 ha unless special functions or ecological importance is identified. In this case, smaller wetland communities or wetlands may be delineated.

The upland vegetation communities were characterized using ELC to classify and map ecological communities to the community class or lower. The ecological community boundaries were generally defined through the review of satellite imagery and further refined during field investigations. Like OWES, the ELC protocol recommends that a vegetation community be at least 0.5 hectares (ha) in size before it is defined. Based on the composition of vegetation communities within the Site, patches of vegetation less than 0.5ha were described as inclusions (if required). The information was documented and classified according to species and locational data was gathered using a hand-held GPS.

Plants that could not be identified in the field were collected for a more detailed examination in the laboratory. Nomenclature used in this report follows the Southern Ontario Plant List (Bradley, 2010) for both common and scientific names which are based on Newmaster et al. (1998). Authorities for scientific names are given in Newmaster et al. (1998).

3.2.2 Species at Risk Plants, including Butternut Inventory

Specific attention was paid to locating SAR plants or plant species of conservation value listed as potentially occurring within the Project area. If these species were observed, they would be photographed, and their coordinates recorded on a hand-held GPS using NAD 83.

The recently updated Butternut Assessment Guidelines (BAG) were followed (MECP, 2021). The following was completed:

- A butternut inventory was completed for the Project alignment and the adjacent 50 m, where access was permitted.
  - Individual trees were marked with white spray paint and/or flagging tape and numbered sequentially.
  - Their UTMs, using a GPS unit set at NAD 83, were recorded. The individual was to be assessed according to the BAG protocol.

3.2.3 Aquatic Habitat Descriptions

To assess the potential impacts to fish habitat, fish communities, or fish SAR, the aquatic habitats within the two aquatic study areas were assessed based on the point observation technique used by Ontario Stream Assessment Protocol (Stanfield, 2013) and the Ministry of Transportation of Ontario (MTO)'s Environmental Guide for Fisheries (MTO, 2020). This project included a description of the channel morphology using evenly spaced transects upon which data was recorded from evenly spaced observation points. The data collected included: channel width, wetted width, bankfull depth, water depth, substrate size, morphological units, temperature, pH, and in-stream cover. The locations of the stations described is provided in the results section.

3.2.4 Incidental Observations

During all visits, any wildlife observations were recorded. Incidental observations included observations of an individual, its tracks, burrows, feces and/or kill sights.

3.3 Evaluation of Natural Heritage Features

The natural heritage features identified as present or as candidate features based on the background review and site investigations are brought forward for evaluation as per the applicable provincial and/or federal guidelines for that feature or species at risk. This step is completed following the site investigations and further described in Section 6 of this report.

4. Background

4.1 Summary of Known Natural Heritage Features

The Site is situated in the Town of Lindsay and is surrounded by parkland, residential, and commercial buildings. There are no natural heritage features onsite other than aquatic habitat associated with the Scugog River and valleylands that are zoned as "hazard lands" by the Town of Lindsay OP. No wetlands were identified on site or within 120 m of the site. An unevaluated wetland was present approximately 318 m north of the Site. Two provincially significant wetlands, Sturgeon Lake No. 27 and Stony Creek Headwaters, were identified within 5 km of the site. Natural Heritage Features are summarized in Table 2 and displayed in Figure 3 and Figure 4.

Table 2: Summary of Available Background Information on the Identified Natural Features within the Study Area

Natural Heritage Systems	Present within Area to be Impacted	Present within Adjacent Lands (120m) of Area to be Impacted	Comments
Provincially Significant Wetlands	None		As per LIO Sturgeon Lake No. 27 PSW approximately 1978 m north of site.
Unevaluated Wetlands	None	None	As per LIO closest 318m north of site.
Fish Habitat	Scugog River	Feature 1	Discussed in Section 5.3.5
Significant Woodlands	None		None
Significant Valleyland	None		None
Significant habitat of Endangered and Threatened Species (SAR)	Potential for endangered or threatened species needs to be determined following assessment of the suitable habitats in or near the site. The list below of potential SAR (Table 3) is based on a review of the satellite imagery and background information on potential species. This list of species to be brought forward is updated as needed in Section 5.		None
Significant Wildlife Habitat	None identified on Schedules		Discussed in Section 6
Areas of Natural and Scientific Interest (ANSIs)	None		None
Hazard Lands	Present along Scugog River		Discussed in Section 6
Environmentally Sensitive Features	None		None

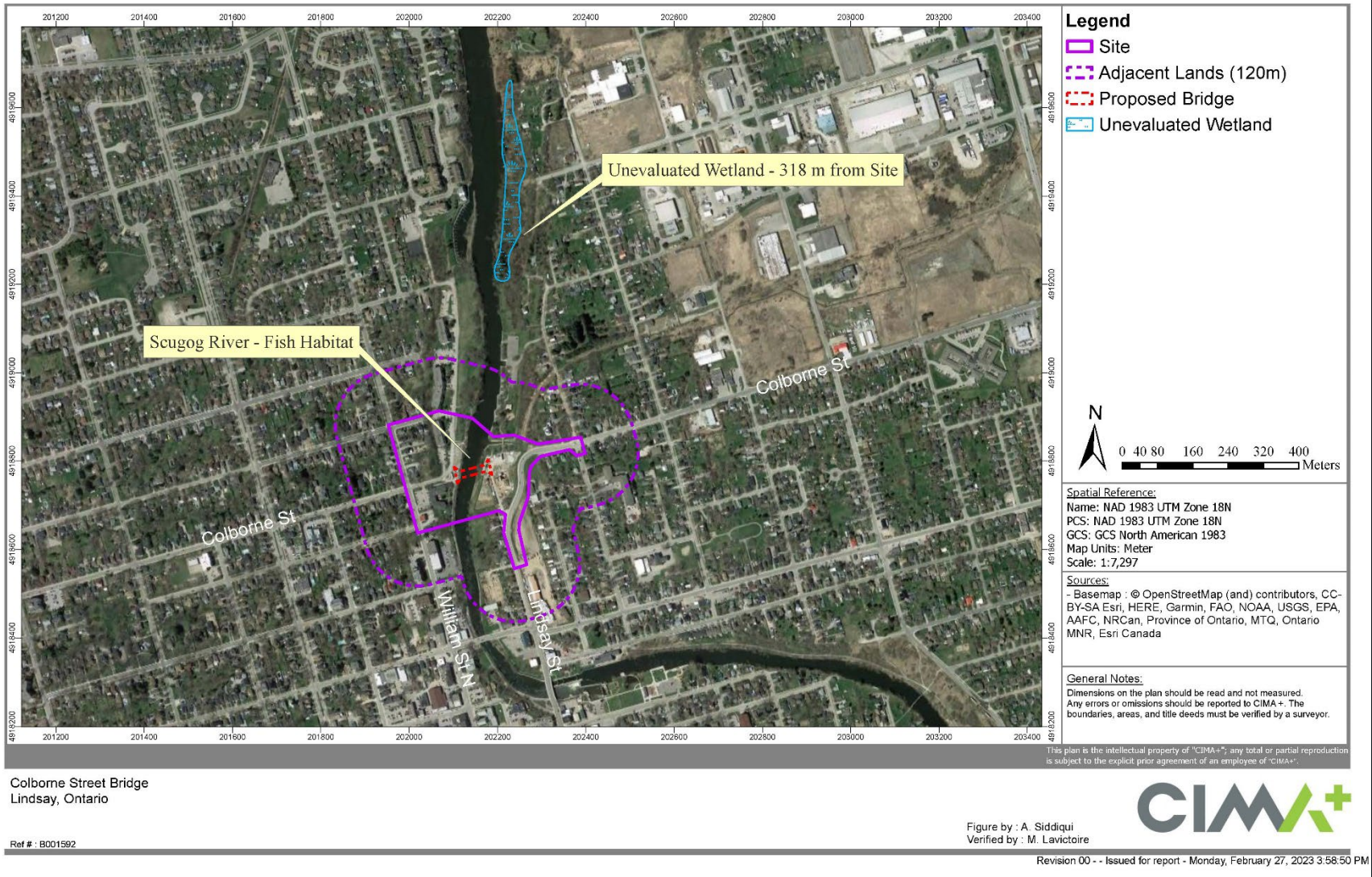

Figure 3: Summary of Natural Heritage Features on Site and Adjacent Lands – LIO2km

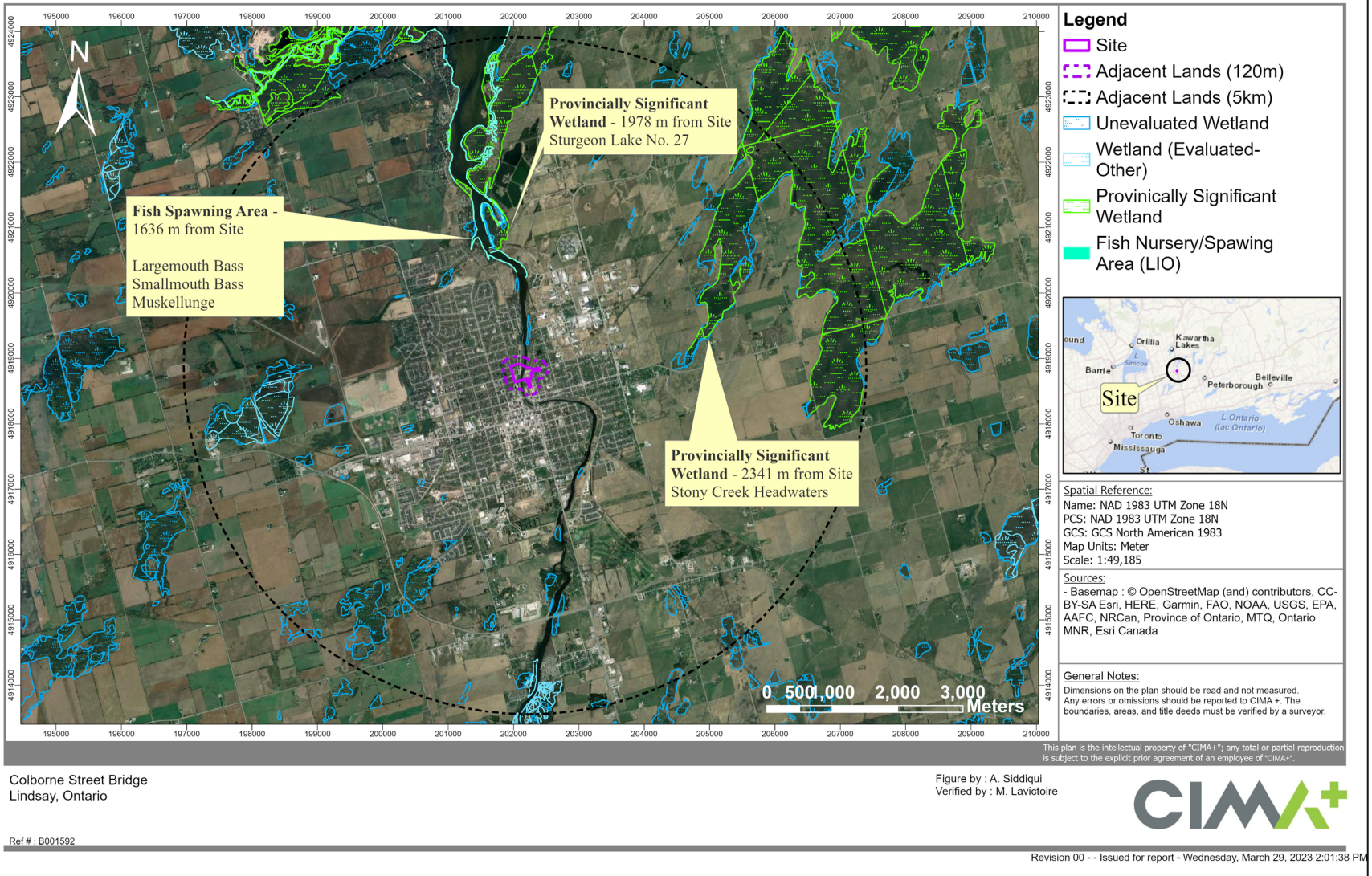

Figure 4: Summary of Natural Heritage Features on Site and Adjacent Lands – LIO5km

4.2 Endangered and Threatened Species and their Habitat

Endangered and Threatened SAR are protected under the provincial ESA. On private land, the federal *Species at Risk Act*, 2002 applies only to fish species. Most birds, including SAR, also receive protection from MBCA, 1994, and/or FWCA, 1997. Together, provincially and federally protected species are referred to as SAR, herein. This Site is situated on private lands and as such, the evaluation of presence was completed following the province's guidelines.

A list of provincially Endangered and Threatened species that are known to occur within 5km of the Site was compiled using various sources. The NHIC database provides information available to the public on those SAR documented as occurring within the general area. It should be noted that not all information for all species is available to the public. Furthermore, the absence of a record does not necessarily indicate that the species is absent from the area. The purpose of the NHIC database is to help determine what species may occur within the Project area. The background review included looking at the list of birds observed in local squares as part of the Ontario Breeding Bird Atlas (OBBA) and any SAR species listed on these lists were considered as potentially occurring within the subject lands. Similarly, all SAR reptiles and/or SAR amphibians included in the Ontario Reptile and Amphibian Atlas (ORAA) within the vicinity of the Site were included in the assessment. Added to this list were species that often occur within the general area based on personal experience or observations. The resulting list includes 13 potential SAR: 1 reptile (Blanding's turtle), 7 birds (least bittern, chimney swift, red-headed woodpecker, loggerhead shrike, bank swallow, bobolink, eastern meadowlark), 4 mammals (little brown myotis, northern myotis, eastern small-footed myotis, and tri-colored bat), and 2 plants (butternut and black ash) (Table 3). Note that following site investigations, this list of species and potential occurrences was reviewed and adjusted to reflect findings.

For some species, the federal and/or provincial governments provide guidelines on which habitats should receive automatic protection. This is usually based on distances from known sightings or suitable habitat. Federally, the habitat is typically classed based on function, while provincially habitat is either regulated or general habitat. Regulated habitat has a detailed description and is prescribed in an Ontario Regulation. General habitat often splits the habitat requirements into up to three categories, listed as Categories 1-3, with 1 being the most sensitive to disturbances. Note the exception with Butternuts where Category 1 individuals are least sensitive. In Table 2 below, candidate SAR for the Project are listed along with their habitat needs. Where guidance is provided by the government, it is used to evaluate whether to bring the species forward to assessment. When there is no guidance provided, the available literature is used to evaluate the suitability of the habitat on-site for that species. Additional information is provided for the species brought forward in Section 6

Table 3: List of Potential Endangered or Threatened Species and Identification of those Brought Forward following Site Investigations

Common Name	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Guidelines/Triggers for Review	Brought Forward (Yes/No)
REPTILES							
Blanding's Turtle	*Emydoidea blandingii*	S3	THR	END	Shallow water, large marshes, shallow lakes, or similar such water bodies (COSEWIC, 2016). Provincial guidelines provide general habitat protection to suitable habitat within 2 km of an occurrence when certain conditions are met (MECP, 2019).	Recent occurrences within study area. May use the river itself for movement. Species brought forward.	Yes
BIRDS							
Least Bittern	*Ixobrychus exilis*	S4B	THR	THR	Freshwater marsh habitat with dense vegetation (Sandilands, 2011; COSEWIC, 2009). Nests are typically in cattail marshes, near edge or openings but they have been found in other emergents and occasionally in willow. COSEWIC states that the species must have emergent marsh with open water areas and stable water levels and are usually found in those that are larger than 5 ha (COSEWIC, 2009). Provincially, this species receives only general habitat protection.	There is no suitable habitat for this species within 500 m of the Site. Species considered absent.	No
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR	Cities, towns, villages, rural, and wooded areas. This species rarely utilizes trees; they prefer trees greater than 50 cm in diameter and that are within 1 km of waterbodies (COSEWIC 2018). Provincially, this species' protected habitat consists of Category 1 habitat, which is a human-made nesting/roosting feature or natural nesting/roosting tree cavity, as well as the area within 90 m of the natural tree cavity (MECP, 2024). No Category 2 or 3 habitats are outlined for this species (MECP, 2024).	Many structures and large trees around the site which may provide habitat for this species. However, at this time, none are anticipated to be impacted by the work.	No
Red-headed Woodpecker	*Melanerpes erythrocephalus*	S4B	END	END	Open deciduous woodland, woodland edges, and sparsely treed habitats. (COSEWIC, 2018; MECP, 2022). The province does not currently have guidance for the general habitat of this	There is no suitable habitat for this species within 600 m of the study area. Species considered absent.	No

Common Name	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Guidelines/Triggers for Review	Brought Forward (Yes/No)
					species, though critical habitat is identified (both federally and provincially) as the suitable habitat within a 200 m radius around a nest observation OR the 600 m around confirmed or probable breeding OR two possible breeding records within 600 m and 7 days of each other (MECP, 2022; ECCC, 2019). Observations must be from after 2021.		
Loggerhead Shrike	*Lanius ludovicianus*	S2B	END	END	Breeding habitat is characterized by open areas such as pastures, prairie grasslands, and agricultural fields. Nesting sites are small shrubs and trees, usually those with thorns or dense interiors (COSEWIC, 2014). The federal recovery strategy states that the species critical habitat is all suitable habitat patches in which confirmed or probable breeding evidence was observed between 2004-2008 (ECCC, 2010) OR two such observation were made in differing years between 1999-2003 as well as suitable habitat patches of which >50% fall within a 400 m radius of the observation/s. Provincially, the species' critical habitat is the 200 m surrounding a nesting site (Category 1) and 200 m surrounding the Category 1 habitat (Category 2) (MECP, 2016).	Breeding population at Carden Alvar, but no recent records within 5 km, and no suitable thicket communities on the Site. This species is considered absent.	No
Bank Swallow	*Riparia riparia*	S4B	THR	THR	This species nests within vertical banks, with a preference for sand-silt substrate. Nesting sites more likely near open upland habitats. (COSEWIC, 2013). Provincially, the species protected habitat is the 50 m in front of a breeding colony's bank face and all suitable foraging habitat within 500 m (MECP, 2024).	No suitable banks present. Species considered absent.	No
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR	Primarily in forage crops, and grassland habitat. It is sensitive to edge effects, size of habitat and areas with dense shrub vegetation or a litter layer deeper than a few centimeters (COSEWIC, 2022). Provincially, this species' protected habitat is the area extending 60 m from the nest as well as the 300 m of suitable habitat around the nest (McCracken, 2013).	No suitable grassland habitat within 300 m of study area. This species is considered absent.	No

Common Name	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Guidelines/Triggers for Review	Brought Forward (Yes/No)
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR	Typically require larger grasslands but have been known to breed in habitats that were 1 ha in the United States. Usually, this species' defended territories consist of 2.8-3.2 ha of uncut meadow or field (OMNRF, 2018). Personal observations of successful nesting habitat for this species in Eastern Ontario have not found any successful nesting pairs in habitats that were less than 5 ha, which is estimated to be this species' approximate area requirement (COSEWIC, 2011). Provincially, this species protected habitat is the area extending 100 m from the nest as well as the 300 m of suitable habitat around the nest (McCracken, 2013).	No suitable grassland habitat within 300 m of study area. This species is considered absent.	No
MAMMALS							
Little Brown Myotis	*Myotis lucifugus*	S4	END	END	Females establish summer maternity colonies, often in buildings or large-diameter trees. Foraging occurs over water, along waterways, and forest edges. Overwinter in cold and humid hibernacula (caves/mines) (COSEWIC, 2013). Critical habitat has not yet been defined by the province.	All 7 SAR bat species are known to roost and/or inhabit cavities and should be considered possible on the Site or Adjacent Lands. Ranges are generally quite poorly understood but all are known from across Southern Ontario. Day-roost habitat would be the main consideration as maternity sites are typically in large trees within mature woodlands, or in structures, neither of which are present on the Site. There were no potential hibernacula for bats or any suitable maternity habitat for Eastern Small-footed Myotis (i.e., no rocky habitat). MECP timing windows for	Yes
Northern Myotis	*Myotis septentrionalis*	S3	END	END	Older (late successional or primary forests) with large interior habitat and snags that are in the mid-stage of decay. They prefer intact interior habitat and are sensitive to edge habitats (Menzel et al., 2002; Broders et al., 2006). Critical habitat has not yet been defined by the province.		
Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END	No Status	Roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. The recovery strategy for the eastern small-footed myotis indicates that the preferred maternity habitat of this species consists of open rock habitats. In the winter, these bats hibernate, most often in caves and abandoned mines		

Common Name	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Guidelines/Triggers for Review	Brought Forward (Yes/No)
					(Humphrey, 2017). Critical habitat has not yet been defined by the province.	vegetation clearing will be followed to prevent potential harm to woodland breeders and to any species using trees for day-roosts.	
Tri-colored Bat	*Perimyotis subflavus*	S3?	END	END	Females establish summer maternity colonies, often in buildings or large-diameter trees. Foraging occurs over water, along waterways, and forest edges. Overwinter in cold and humid hibernacula (caves/mines). (COSEWIC, 2013). Critical habitat has not yet been defined by the province.		
Silver-haired Bat	*Lasionycteris noctivagans*	S4	END	END	Females establish summer maternity colonies in large diameter trees (COSEWIC, 2023). They also use buildings as roosting sites. Critical habitat has not yet been defined. Provincially, hibernacula have a buffer of 200 m. Buffers for maternity sites have not been established.		
Eastern Red Bat	*Lasiurus borealis*	S4	END	END	Day roosts can be in a variety of deciduous and coniferous forest types, usually in trees but occasionally shrubs. Trees used as maternity roosts tend to be large diameter and tall (COSEWIC 2023). Migrate south to hibernate in the southern United States (COSEWIC 2023). Critical habitat has not yet been defined. Provincially, hibernacula have a buffer of 200 m. Buffers for maternity sites have not been established.		
Hoary Bat	*Lasiurus cinereus*	S4	END	END	Near open, grassy areas in forests or over lakes. Day roosts can be in a variety of deciduous and coniferous forest types, usually in trees but occasionally shrubs. Trees used as maternity roosts tend to be large diameter and tall (COSEWIC 2023). Migrate south to hibernate in the southern United States (COSEWIC 2023). Critical habitat has not yet been defined. Provincially, hibernacula have a buffer of 200 m. Buffers for maternity sites have not been established.		
VASCULAR PLANTS							

Common Name	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Guidelines/Triggers for Review	Brought Forward (Yes/No)
Butternut	*Juglans cinerea*	S2?	END	END	Found in a variety of habitat types but grows best on well-drained fertile soils in shallow valleys and on gradual slopes (COSEWIC, 2003). The federal recovery strategy does not outline critical habitat for this species. Provincially, butternuts are assessed and categorized based on the amount of canker. These categories are outlined in Section 6.	Several occurrences in general area but none observed within study area during vegetation survey. As the species requires assessment every 2 years, this species is being brought forward.	Yes
Black Ash	*Fraxinus nigra*	S4	END	No Status	Swamps, bogs, and riparian areas, occasionally poorly drained upland areas (COSEWIC, 2018).	No suitable habitat present and none observed on or near site during vegetation survey.	No

Table Updated: March 2026

SRANK Definitions

SH Possibly Extirpated (Historical), Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20–40-year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.

S1 Critically Imperiled, critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled, Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable, Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure, Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S#S# Range Rank, A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

? Inexact Numeric Rank—Denotes inexact numeric rank

S#B Breeding

SARO Status Definitions

END Endangered: A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened: A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern: A species with characteristics that make it sensitive to human activities or natural events.

4.3 Available Background Information on Fish Habitat and Communities

The proposed bridge crosses the Scugog River, which flows northward into Sturgeon Lake and comprises direct fish habitat. As a navigable waterway, the Scugog is under the jurisdiction of the Federal government and the *Fisheries Act*, 1985, applies. Immediately north of the work zone, at the edge of the Site boundary, is the outlet of an unnamed tributary to the Scugog River (herein referred to as "Feature 1"). Its headwaters are approximately 6.2 km NE of the Site. This tributary flows through a portion of the Adjacent Lands before joining with the Scugog near the proposed bridge Site.

Information was available for the Scugog River on both the Aquatic Resource Area (ARA) database on LIO, and on iNaturalist. LIO's ARA database identified 31 fish species in the Scugog River (see Table 4). iNaturalist identified 2 of those same species (Northern Redbelly Dace and Fathead Minnow) plus 1 additional species (Western Blacknose Dace). All are common warm to cool water species. Of these, 4 sportfish (Muskellunge, Smallmouth Bass, Largemouth Bass, Walleye) and 5 pan fish (Rock Bass, Bluegill, Pumpkinseed, Black Crappie, Yellow Perch) were identified.

LIO identified 9 species as occurring in Feature 1, all of which are common warm to cool water fish. Of these, 1 sportfish (Largemouth Bass) and 1 pan fish (Pumpkinseed) were identified. Only one species (Northern Pearl Dace) was documented in Feature 1 but not in the Scugog River, and this record was found in iNaturalist but not in LIO.

Fish spawning habitat for Smallmouth Bass, Largemouth Bass, and Muskellunge was identified approximately 1.6 km north of the Site, near the mouth of the Scugog River (Figure 3).

The DFO Canadian Aquatic Species at Risk Mapping (CASAR) indicates that there are no records of federally Endangered, Threatened, or Special Concern fish or mussel species anywhere in the vicinity of the Project (Appendix A).

Table 4: Background Fish Community Information for the Scugog River and Feature 1

Common Name	Scientific Name	Trophic Class*	Thermal Regime	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Scugog River	Feature 1	Source
Muskellunge	Esox masquinongy	carnivore	warm	S4	No status	No status	Y	N	LIO, 2023
Central Mudminnow	Umbra limi	invertivore	cool	S5	No status	No status	Y	Y	LIO, 2023
Central Stoneroller	Campostoma anomalum	herbivore	cool	S4	No status	No status	Y	N	LIO, 2023
Common Carp	Cyprinus carpio	invertivore/ detritivore	warm	SNA	No status	No status	Y	N	LIO, 2023
Brassy Minnow	Hybognathus hankinsoni	planktivore/ detritivore	cool	S5	No status	No status	Y	N	LIO, 2023
Common Shiner	Luxilus cornutus	invertivore	cool	S5	No status	No status	Y	N	LIO, 2023
Northern Pearl Dace	Margariscus nachtriebi	invertivore/carnivore	cool	S5	No status	No status	N	Y	iNaturalist, 2020
Emerald Shiner	Notropis atherinoides	planktivore	cool	S5	No status	No status	Y	N	LIO, 2023
Blackchin Shiner	Notropis heterodon	invertivore	cool	S4	NAR	No status	Y	N	LIO, 2023
Spottail Shiner	Notropis hudsonius	invertivore/ planktivore	cool	S5	No status	No status	Y	N	LIO, 2023
Northern Redbelly Dace	Chrosomus eos	invertivore/planktivore	cool	S5	No status	No status	Y	Y	LIO, 2023, iNaturalist, 2023
Finescale Dace	Chrosomus neogaeus	invertivore/planktivore	cool	S5	No status	No status	Y	N	LIO, 2023
Bluntnose Minnow	Pimephales notatus	detritivore	warm	S5	NAR	No status	Y	N	LIO, 2023
Fathead Minnow	Pimephales promelas	detritivore/ invertivore	warm	S5	No status	No status	Y	Y	LIO, 2023, iNaturalist, 2023
Western Blacknose Dace	Rhinichthys obtusus	invertivore	cool	S5	No status	No status	Y	Y	iNaturalist, 2023
Longnose Dace	Rhinichthys cataractae	invertivore	cool	S5	No status	No status	Y	N	LIO, 2023
Creek Chub	Semotilus atromaculatus	invertivore/ carnivore	cool	S5	No status	No status	Y	Y	LIO, 2023
White Sucker	Catostomus commersonii	invertivore/ detritivore	cool	S5	No status	No status	Y	N	LIO, 2023
Yellow Bullhead	Ameiurus natalis	invertivore/ carnivore	warm	S4	No status	No status	Y	N	LIO, 2023
Brown Bullhead	Ameiurus nebulosus	invertivore/ herbivore/ carnivore	warm	S5	No status	No status	Y	N	LIO, 2023
Banded Killifish	Fundulus diaphanus	invertivore/planktivore	cool	S5	NAR	No status	Y	N	LIO, 2023
Brook Silverside	Labidesthes sicculus	planktivore/ invertivore	warm	S4	No status	No status	Y	N	LIO, 2023
Brook Stickleback	Culaea inconstans	planktivore/invertivore	cool	S5	No status	No status	Y	N	LIO, 2023

Common Name	Scientific Name	Trophic Class*	Thermal Regime	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Scugog River	Feature 1	Source
Rock Bass	Ambloplites rupestris	invertivore/carnivore	cool	S5	No status	No status	Y	N	LIO, 2023
Pumpkinseed	Lepomis gibbosus	invertivore/carnivore	warm	S5	No status	No status	Y	Y	LIO, 2023
Bluegill	Lepomis macrochirus	invertivore	warm	S5	No status	No status	Y	N	LIO, 2023
Smallmouth Bass	Micropterus dolomieu	invertivore/ carnivore	cool	S5	No status	No status	Y	N	LIO, 2023
Largemouth Bass	Micropterus salmoides	invertivore/ carnivore	warm	S5	No status	No status	Y	Y	LIO, 2023
Black Crappie	Pomoxis nigromaculatus	invertivore/ carnivore	cool	S4	No status	No status	Y	N	LIO, 2023
Yellow Perch	Perca flavescens	invertivore/ carnivore	cool	S5	No status	No status	Y	N	LIO, 2023
Logperch	Percina caprodes	invertivore	warm	S5	No status	No status	Y	Y	LIO, 2023
Blackside Darter	Percina maculata	invertivore	cool	S4	No status	No status	Y	N	LIO, 2023
Walleye	Sander vitreus	invertivore/carnivore	cool	S5	No status	No status	Y	N	LIO, 2023
Number of Species							32	9	

(Coker et al., 2001; Eakins, 2018; LIO, 2011; Page et al., 2013; Scott & Crossman, 1973; KC, 2003, iNaturalist,2020-2023)
Table Updated: November 26, 2024

SRANK DEFINITIONS

S4 Apparently Secure, Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 Secure, Common, widespread, and abundant in the nation or state/province.
SNA Not Applicable, A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

5. Site Investigations

5.1 Site Visit Dates and Purpose

A summary of the dates, times, ambient conditions, and purpose for site visits are provided in Table 5. Rainfall and water level conditions are included alongside the aquatic field work to capture the general watershed conditions at the time of the work. The vegetation communities are described in the section below, followed by the results from the aquatic surveys.

Table 5: Summary of Dates, Times, Conditions and Purpose of Site Investigations

Date	Time (h)	Staff	Air Temperature (Min-Max) °C*	Cloud Cover (%) Beaufort Wind Scale [Descriptor (scale)]	Total Rainfall (mm) 7 days prior to visit*	Water Level Conditions**	Purpose
May 2, 2023	1325-1900	S. Lafrance J. Zientek	9.0 (3.9-7.2)	Overcast (100) Gentle breeze (3)	21.5	Normal	▪ Aquatic Habitat Description ▪ Fish Sampling
June 27, 2023	1330-1730	C. Little	19°C (15°C-21°C)	Light Rain Light breeze (2)	NA	NA-	▪ Vegetation Descriptions ▪ SAR Plants
July 19, 2023	1526-	S. Lafrance	22°C	Partly Cloudy (25%) Light Breeze (1)	NA	NA	▪ Aquatic Habitat Description

C. Little – Casey Little – Graduate Diploma, Ecosystems Management

S. Lafrance – Sophie Lafrance – B.Sc. Biology, Graduate Diploma in Ecosystem Restoration

*Min-Max Temp and past rainfall Taken From: Environment Canada. National Climate Data and Information Archive. Available http://climate.weatheroffice.gc.ca/ [November 29, 2023]

** Water Level Conditions taken from Kawartha Conservation (https://www.kawarthaconservation.com)

Normal/No Flooding: No flood conditions exist.

5.2 Vegetation Community Descriptions

The Site is heavily developed and comprised of manicured parkland, existing residential homes, as well as commercial businesses. The natural areas are limited to a narrow woodlot north of Lindsay Street that divides Rivera Park and St. Paul Street; Another very small portion of woodland on a slope to the North of Colborne St. W., and the Scugog River and Feature 1 themselves which contain a narrow strip of riparian vegetation and some isolated fragments of marsh.

The site investigations were completed during the growing season. The vegetation communities (minimum size 0.5 ha as per both ELC and OWES, unless a significant smaller community is identified) are described below along with the dominant plant species and a representative photograph. For this project, there was one smaller community that warranted delineation as it is the only wetland habitat within the Site. The vegetation communities were categorized as:

- Parkland (dominated by mowed lawn and planted trees)
- Cultural Meadow (dominated by herbaceous species with no more than 25% cover provided by either shrub or tree species
- Deciduous Forests (communities with >75% canopy cover by deciduous trees)
- FOD7 - Fresh-Moist Lowland Deciduous Forest
- Marsh (wetland plant species provide 50% or more cover; and community is dominated by narrow-leaved emergents (ne).
  - neM

These vegetation communities are displayed in Figure 4 below.

5.2.1 Upland Community

Parkland

The majority of the Site is situated in Rivera Park which consists of a manicured lawn with scattered planted trees. The ground cover layer (the dominant layer) was densely vegetated (100% cover) consisting exclusively of manicured/mowed Kentucky Bluegrass. Woody vegetation was present but only in low densities. The scattered trees represent a canopy layer (7-18 m tall, 15% cover) that was composed of various planted deciduous and coniferous street trees. There was no subcanopy.

Photo 1: View of typical manicured/mowed lawn community within the park (June 27, 2023).

Photo 2: View of typical manicured/mowed lawn community within the park (June 27, 2023).

Photo 3: View of manicured/mowed lawn and parking lot within the park (June 27, 2023).

Photo 4: View of manicured/mowed lawn and treatment plant within the park (June 27, 2023).

Cultural Meadow

There were several cultural meadows within the Site and Adjacent Lands. The ground cover layer was densely vegetated (100% cover), consisting of grasses and broadleaf species, primarily Kentucky bluegrass, tall goldenrod, alsike clover, red clover, calico aster, cow vetch, wild carrot, chicory, and birds-foot-trefoil. There were also cultural meadow areas that consisted of manicured lawn dominated by Kentucky bluegrass. These areas were associated with private residences, and/or commercial buildings, and along the Lindsay Street North right-of-way (Photo 5 and Photo 6).

Photo 5: View of cultural meadow along the Lindsay Street right-of-way (June 27, 2023).

Photo 6: View of cultural meadow and residential homes along the Lindsay Street right-of-way (June 27, 2023).

Fresh-Moist - Lowland Deciduous Forest (FOD7)

The only FOD7-4 community within the Site consists of a narrow woodlot north of Lindsay Street which divides Rivera Park and St. Paul Street. The canopy (14-20 m tall, 75% cover) was primarily composed of black walnut (DBH 15-40 cm), willow (DBH 17-65 cm), and Manitoba maple (DBH 10-45 cm). The understory (0.5-5 m tall, 10% cover) was primarily common buckthorn, staghorn sumac, and black walnut saplings. The ground cover layer (75% cover) was composed of tall goldenrod, cow vetch, and grasses. Photo 7 displays the western edge of this woodlot adjacent to Rivera Park.

Photo 7: View of the Lowland Deciduous Forest community east of Rivera Park (June 27, 2023).

5.2.2 Wetland Community – Inclusion

Narrow-leaved emergent Marsh (neM)

There is one meadow marsh community on Site; a narrow strip of riparian vegetation alongside the municipal drain (Feature 1) that flows westward into the Scugog River. Although this area was less than 0.5 ha, (the minimum community size to be delineated as per OWES) this marsh community is mapped as an inclusion due to it being the only wetland habitat on site. The dominant form in this community was narrow-leaved emergents which consisted of reed canary grass (60%) and sedges (35%). There was also a tall shrub form that consisted of red-osier dogwood (5%) situated along the top of bank adjacent to the pedestrian bridge over the constructed drain. Figure 5 displays the neM polygon comprised of reed canary grass, and Photo 9 displays the portion comprised of sedges.

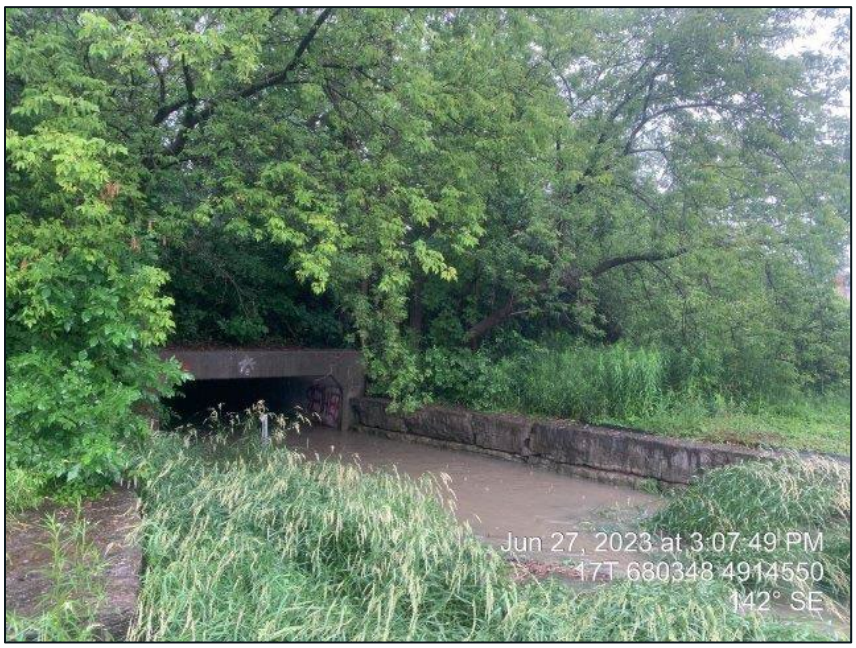

Photo 8: View of narrow-leaved emergent marsh (reed canary grass) along constructed drain (June 27, 2023).

Photo 9: View of narrow-leaved emergent marsh (sedges) along constructed drain (June 27, 2023).

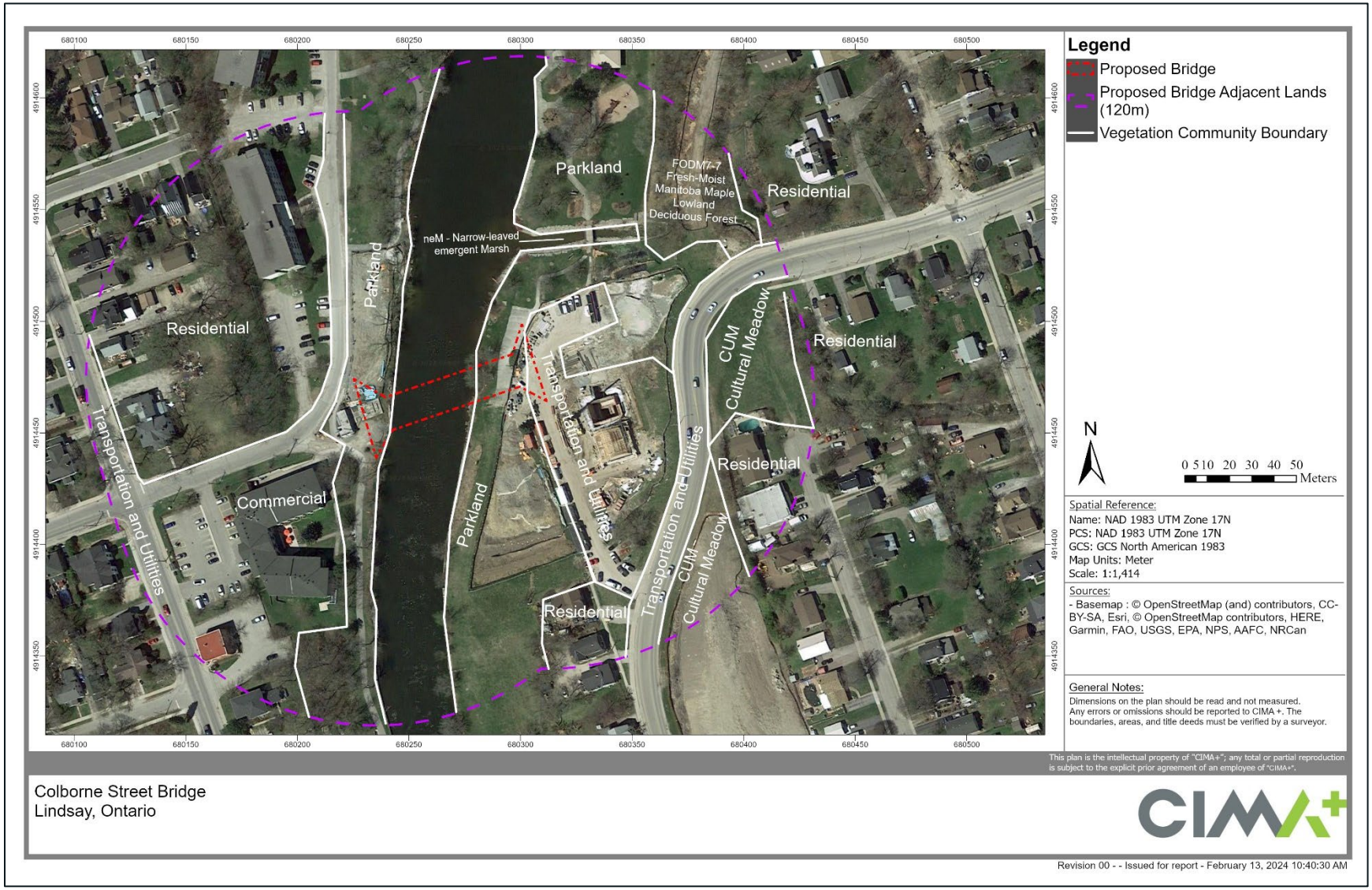

Figure 5: ELC Communities within the Project Area and Adjacent Lands (120 m)

5.3 Butternut Survey Results

Surveys for butternut and other SAR plants were completed within the Site boundaries. "Over the fence" surveys were completed in areas where access was not permitted (i.e., private lands). No butternut or other SAR plants were observed within the Project area.

5.4 Aquatic Habitat Assessment Results

5.4.1 Scugog River

The Scugog River begins at Lake Scugog and flows 14.4 km before reaching the proposed work area. It then flows an additional 3 km before reaching Sturgeon Lake. The river was un-wadable and all observation during the visit was completed from the bank. The river had abundant aquatic vegetation and cobbles and boulders on its edges. Based on fisherman's observations, the river houses a large population of pan fish.

Photo 10: Scugog River looking upstream (July 19, 2023)

Photo 11: Scugog River looking downstream at the work location (July 19, 2023)

5.4.2 Unnamed Tributary to the Scugog River (Feature 1)

Feature 1 began 6.2 km northeast of the confluence with the River. The tributary began in multiple branches in agricultural fields and flowed mostly through agricultural fields and through some forested corridors throughout its length. There were three culverts on Feature 1 within the walked area. The tributary downstream of the culverts, near its confluence with the river, flowed through a heavily vegetated area (Photo 12). The downstream culvert was located 65 m upstream of its confluence with the river and did not pose any barriers to fish movement (Photo 13). The tributary then flowed through a rocky area with reinforced banks (Photo 14). The following culvert under Lindsay Street North also did not pose a barrier to fish movement (Photo 15)

The culvert at St Paul Street did not create a fish barrier at the time of the visit but the flow was shallow within it (under 5 cm in some areas) (Photo 16). A seasonal fish barrier was present just downstream of St Paul Street as water was flowing through a rock barrier at the time of the visit but bankfull depths suggested water flows over the barrier in higher waters (Photo 17). Fish were noted on both sides of the barrier. No other barriers were noted.

Habitat stations were created on both the upstream and downstream sides of Lindsay Street North.

Photo 12: Feature 1 flowing through the naturalized area near its confluence with the river, looking downstream (July 19, 2023)

Photo 13: Feature 1 going through the downstream culvert, looking upstream (July 19, 2023)

Photo 14: Feature 1 flowing through the rocky area with reinforced banks, looking upstream (July 19, 2023)

Photo 15: Feature 1 going through the Lindsay Street North culvert, looking downstream (July 19, 2023)

Photo 16: Feature 1 going through the culvert at St Paul Street, looking upstream (July 19, 2023)

Photo 17: Seasonal fish barrier downstream of St Paul Street (July 18, 2023)

5.4.2.1 Station 1 – Downstream End

Station 1 began near the confluence with the Scugog River and ended north of Lindsay Street North and was 80 m in length. The average channel width and bankfull depths were 4.5 m and 15 cm (range: 3-31 cm), respectively. The average wetted width and depths in the summer were 2.9 m and 5 cm (range: 0-16 cm), respectively. The habitat was a glide.

The substrate was fines and gravel, with some cobbles. The in-water cover was provided by cobbles, terrestrial vegetation, overhanging vegetation, and aquatic vegetation (watercress, water plantain, rushes, and filamentous algae). Minor signs of erosion were noted in the form of scouring. Reinforced banks were also present along the entire station length.

The top of the banks were partially vegetated with herbaceous vegetation and woody species. The most common herbaceous species were grasses, jewelweed, great burdock, climbing nightshade, thistle, willowherb, ribbon grass, and purple loosestrife. The most common woody species were common buckthorn, sumac, grapevines, cherries, Manitoba maple, and locuses. The station was moderately shaded by woody vegetation and herbaceous vegetation.

Photo 18: Station 1 looking upstream from the downstream end (July 18, 2023)

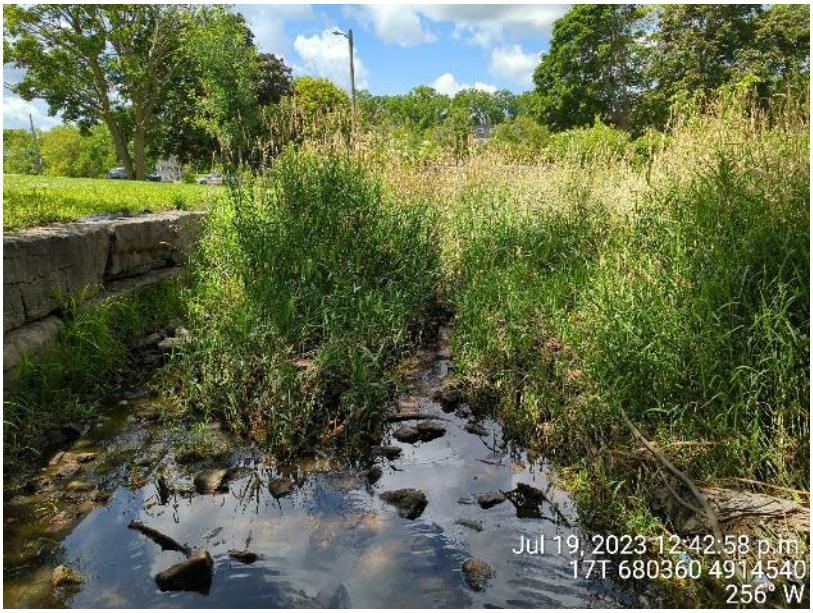

Photo 19 : Station 1 looking downstream from the downstream culvert (July 18, 2023)

Photo 20 : Station 1 looking downstream from the upstream end (July 18, 2023)

5.4.2.2 Station 2 – Upstream End

Station 1 began upstream of Lindsay Street North and ended downstream of St Paul Street and was 120 m in length. The average channel width and bankfull depths were 3.5 m and 17 cm (range: 3-39 cm), respectively. The average wetted width and depths in the summer were 1.8 m and 4 cm (range: 0-20 cm), respectively. The habitat was a glide.

The substrate was fines and gravel, with some cobbles and boulders. The in-water cover was provided by cobbles and boulders, aquatic vegetation (watercress, reed canary grass, and filamentous algae) and terrestrial vegetation. Minor signs of erosion were noted in the form of scouring.

The top of the banks were fully vegetated with herbaceous vegetation and woody species. The most common herbaceous species were spotted jewelweed, highbush cranberry, climbing nightshade, avens, nipplewort, horsetails, knotweed, Virginia creeper, reed canary grass, goldenrod, and ribbon grass. The most common woody species were chokecherry, common buckthorn, alternate-leaf dogwood, grapevine, sumac, ashes, maples, and black spruce. The station was moderately shaded by woody vegetation and poorly shaded by herbaceous vegetation.

Largemouth bass juveniles were observed in a minnow trap just upstream of the station.

Photo 21: Station 1 looking upstream from the downstream end (July 18, 2023)

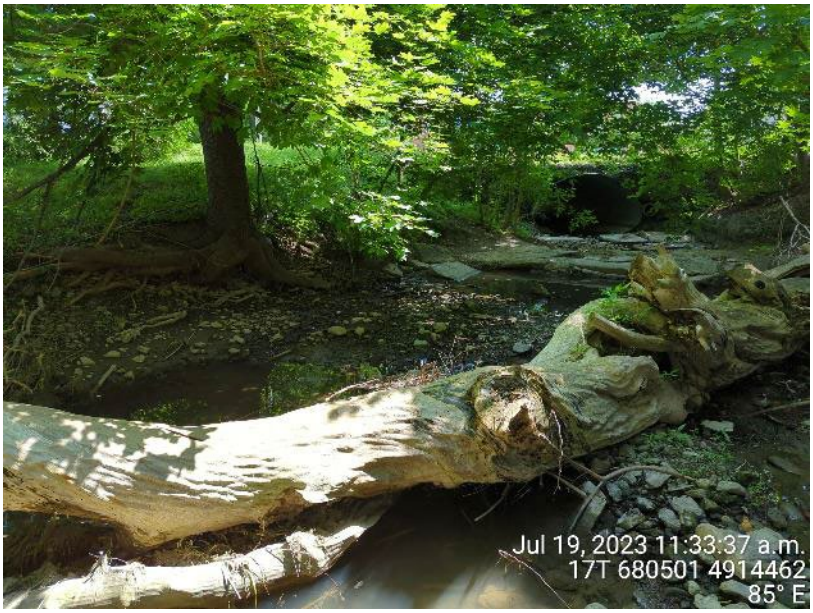

Photo 22 : Station 1 looking downstream from upstream (July 18, 2023)

5.5 Incidental Observations

Incidental wildlife observations for the Site included 9 Birds (Mourning Dove, Black-capped Chickadee, American Goldfinch, Common Grackle, American Robin, Gray Catbird, Canada Goose, American Crow, Blue Jay) and 2 Mammals (Eastern Cottontail and Gray Squirrel). All of these were observed on June 27, 2023 between 13:30 and 15:30 by C. Little. All of these species are common to the area with stable populations and habitats.

6. Evaluation of Significance and Assessment of Impacts

As per the conclusions of the background review and site investigations, potential or known natural heritage features identified were:

- Habitat of endangered and threatened species
  - Potential presence of SAR Herpetofauna (Blanding's Turtle)
  - Potential presence of Bat Maternity Sites or Day-Roosts
- Known or assumed fish habitat
  - Scugog River
  - Feature 1
- Woodlands
- Hazard Lands

The following section assesses whether these features are significant based on the appropriate reference document, or other legislations, as applicable. Where it is determined that a significant natural heritage feature is present or is assumed to be present, the potential impacts are determined based on the understanding of project activities and the impact assessment methods. These methods are summarized below followed by the evaluation for each feature.

6.1 Review of Project Activities

The proposed works consist of the construction of a new clear-span bridge over the Scugog River, the construction of a new access road, and slight realignments of existing roads. This assessment is restricted to the evaluation of the potential to impact SAR and/or their habitat or fish and fish habitat. As such, it reviews the following:

- Clearing of Vegetation
- Demolition of Existing Paved Surfaces and Structures
- Site grading
- Staging and Operation of Equipment
- Construction of a 77-m concrete bridge
- Construction of New Portions of Roadway and Associated Infrastructure
- Site Remediation

It is understood that the stormwater management options will ensure that the same water quality and quantity reaching the two different fish habitats will not change.

6.2 Impact Assessment Methods

The assessment of the potential impacts is completed by analyzing the impact of various activities associated with the Project. The significance of the potential impacts is measured using four different criteria:

Area affected may be:

- local in extent signifying that the impacts will be localized within the Project area.
- regional signifying that the impacts may extend beyond the immediate project area.

Nature of Impact:

- negative or positive
- direct or indirect
- risk (certainty, understanding of impacts)

Duration of the impact may be rated as:

- short term (1-2 years)

- medium term (>2years)
- long term (>7 years).
- permanent

Magnitude of the impact may be:

- negligible signifying that the impact is not noticeable.
- minor signifying that the Project's impacts are perceivable and require mitigation.
- moderate signifying that the Project's impacts are perceivable and require mitigation as well as monitoring and/or compensation.
- major signifying that the Project's impacts would destroy the environmental component within the Project area.

Where identified, the boundaries of any significant features are noted and the potential for the development to cause negative impacts is assessed. For those features which may be negatively impacted, avoidance and mitigation measures are recommended, as appropriate, in Section 7. The PPS (2024) states that a negative impact signifies:

- In regard to fish habitat, any harmful alteration, disruption or destruction of fish habitat, except where an exemption to the prohibition has been authorized under the Fisheries Act;
- In regard to other natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities.
- In regard to policy 4.2, degradation to the quality and quantity of water, sensitive surface water features and sensitive ground water features, and their related hydrologic functions, due to single, multiple or successive development or site alteration activities

6.2.1 Habitat of Endangered and Threatened Species

The following paragraphs provide an assessment of the potential to impact the SAR that were identified and brought forward during the background review (Table 3) and adjusted, as required, following the collection of data from the site investigations.

Areas identified as having known critical habitat and/or habitat regulation receive the strongest protection followed by those with potential critical habitat or General Habitat Descriptions (GHD). Species with only general habitat protection receive the least stringent protection. Any level of habitat protection will signify an automatic need to consult with the appropriate agency. The presence of only general habitat protection could still require consultation, but this would be dependent on the species and the assessment of potential interactions.

6.2.1.1 SAR Reptiles (Blanding's Turtle)

Blanding's turtle is associated with a variety of shallow, slow aquatic habitats with submergent and emergent plants and soft substrates (COSEWIC, 2016). Its preferred aquatic habitat is less than 2 m deep (ECCC, 2018). To err on the side of caution, depths up to 4.5 m are considered habitat for this species (ECCC, 2018). These turtles require basking sites located near the water such as exposed rocks or partially submerged logs. The nesting sites are located within areas of loose substrates varying from sand to cobblestone and may occur along roadways as far as 400 m away from water. Marsh habitat is important for the juveniles for protection from predators. The species overwinters within permanent water bodies (COSEWIC, 2016). This species can migrate far distances of up to 6 km (MECP, 2013). Migration routes can include overland movement. However, some habitats such as active agricultural croplands, sand pits, large waterbodies, fast-flowing systems, and high use highways are not considered suitable habitat (ECCC, 2018). They also note that heavily developed urban areas without aquatic or wetland habitats are considered unsuitable (ECCC, 2018).

The habitat guidelines for Blanding's turtle provide protection to the areas surrounding a nest, or perceived nest area. The level of protection varies with the distance from the nest and has been categorized by MNRF into three categories. These, along with their protection level are:

Category 1: Nest and the area within 30 m or overwintering sites and the area within 30 m

Category 2: The wetland complex (i.e., all suitable wetlands or waterbodies within 500m of each other) that extends up to 2 km from an occurrence, and the area within 30 m around those suitable wetlands or waterbodies

Category 3: Area between 30 m and 250 m around suitable wetlands/waterbodies identified in Category 2, within 2 km of an occurrence

Blanding's Turtle is recorded as occurring within 1 km of the Project area (NHIC square 17PK8014) and in all adjacent NHIC squares. This triggers automatic Category 2 classification of all waterways within these squares, plus a 30-m buffer around these waterways. Any works within the area identified as category 2 habitat (shown in orange on Figure 6) must be reviewed by MECP. As part of this review, the value to the species of the areas impacted needs to be considered.

Nesting sites are typically in the general vicinity of wetlands (usually permanent but also vernal pools) or other areas offering rehydration and foraging. (ECCC, 2018). The nearest wetland larger than 0.5 ha to the Site is located 318 m to the north and is a treed swamp. This type of wetland may have potential to be an overwintering site. As such, the area within 30m of this wetland should be considered Category 1 habitat, and the nearest occurrence of this habitat category to the Site is therefore 288m away. The Scugog River and Feature 1 are both contiguous to this occurrence of Category 1 habitat and therefore have potential to be used as movement corridors by Blanding's Turtle. The value of movement corridors is dependent on the surrounding habitats. There are extensive suitable wetlands along the river to the North and South of Lindsay, and the Scugog River is likely an important movement corridor between these areas. Feature 1, which does not lead to any sizeable wetlands, likely holds lower value as a movement corridor and may also be an ecological trap as it passes through heavily urbanized and degraded areas. Within 120m of the Site, the lands adjacent to the Scugog River and Feature 1 are heavily developed and manicured. While there is a very small (~0.02-ha) marsh at the mouth of Feature 1, it is not thought to be of sufficient size to provide turtles more than brief stopover habitat. Turtles using the river for travel would not be expected to venture onto land in the vicinity of the Site and if they did, this could be considered an ecological trap. It should be noted that disturbed gravel or dirt substrates (which are used for nesting) are considered critical habitat only once they become abandoned.

Based on the above, it is concluded that there is no Category 1 habitat within the Site or Adjacent Lands, and that the Site's value as Category 2 habitat is limited to the waterways themselves. The aquatic features on Site offer potentially high value for linkages to critical habitat, but the use of these features is assumed to be highly seasonal in nature. Nesting attempts by turtles on land within the Site would receive automatic protection, including an area up to 150m around the nest, but such events would be extremely unlikely and would only occur during the nesting window of May-July. By **timing activities outside the nesting window and outside the windows when turtles may be using the Scugog River for migration**, no impacts are expected to occur. Furthermore, because there will be no loss or alteration of aquatic habitat, no long-term or indirect impacts are expected to occur.

Potential to Impact SAR Reptiles

Although there is a very low likelihood that project activities will impact Blanding's turtle or its habitat, due to the presence of the species within 1 km of the site a list of general avoidance and mitigation measures is provided in Section 7 and MECP must be contacted.

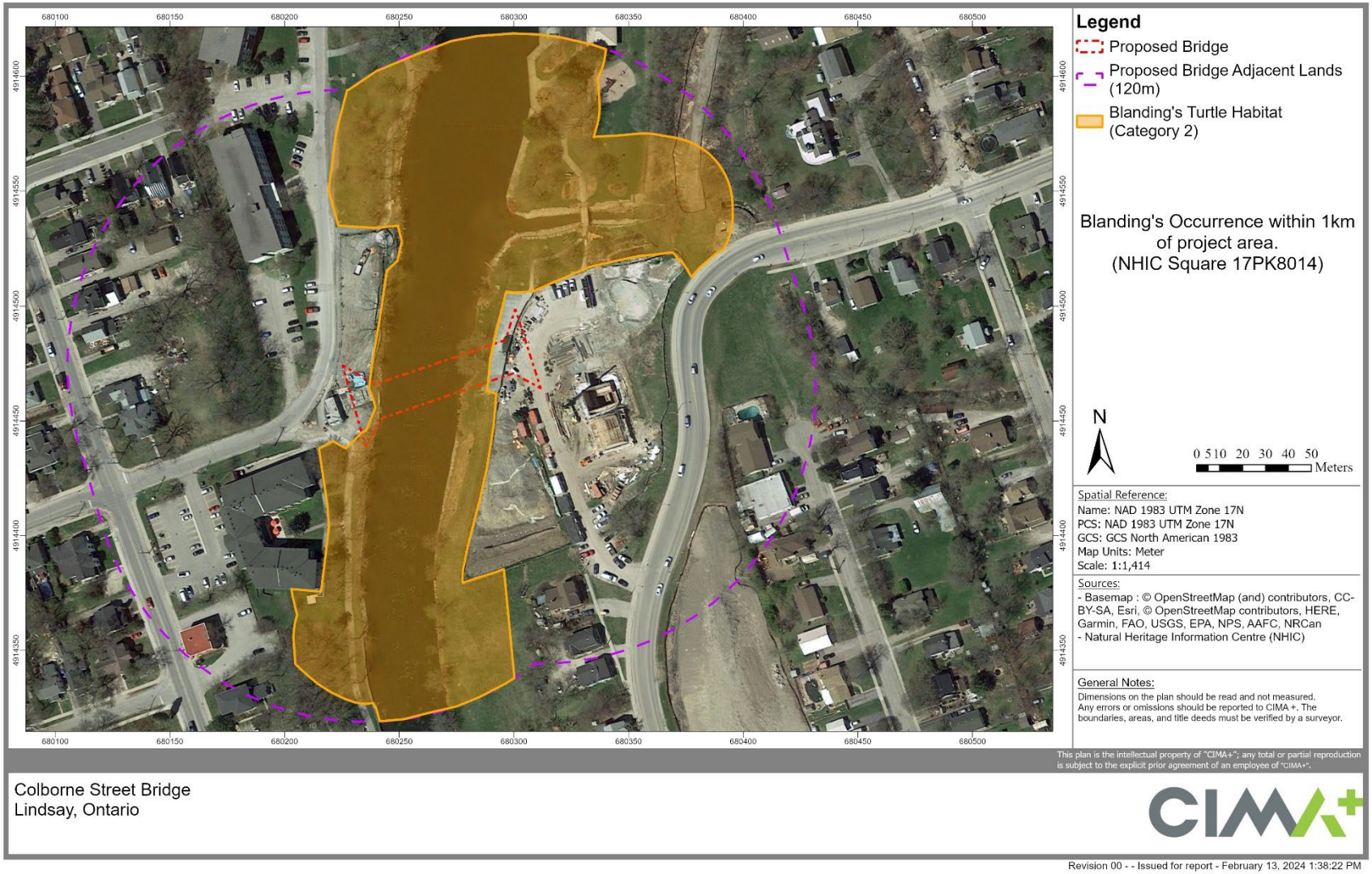

Figure 6: Blanding's Turtle Category 2 Habitat Within Site and Adjacent Lands

6.2.1.2 SAR Bats

The 7 bat species in Table 3 are all endangered species, signifying that they are at risk of becoming extinct or extirpated in Ontario. Eastern small-footed myotis is not listed federally and is therefore not afforded protection under SARA. There are three types of habitats required by bats: hibernation, maternity sites, and day-roost sites. The latter is not considered critical habitat.

All 7 listed bat species should be considered potentially present in the area and may use tree cavities or structures on Site for day-roosting. All 7 species prefer to hibernate in caves or mines, and rarely hibernate in buildings (COSEWIC, 2013). No caves or mines were present within the Site or Adjacent Lands. Maternity Sites for most species tend to be in well-forested areas. The little brown myotis is one of the few bat species that can use anthropogenic structures as maternity sites. Potential suitable structures can include buildings, bridges, barns, and bat boxes. The little brown myotis can also use tall, large cavity trees that are in the early to mid-stages of decay as maternity roosts, as well as loose/raised tree bark, and/or crevices in cliffs (ECCC, 2018). This bat species occurs in higher densities in mature deciduous and/or mixed forests due to increased opportunities for large snags. However, unlike the northern myotis, the little brown myotis does not exclusively require mature forest stands to find appropriate maternity roosts (COSEWIC, 2013). This commonly observed species could establish maternity roosts in this area. MECP guidelines provide advice on avoiding impacts to this species.

Potential to Impact SAR Bats

The potential to impact these species directly is related to tree clearing activities and the demolition of structures. Impacts can be through a direct loss of habitat (i.e., clearing of vegetation), or harm to a maternity colony. Indirect impacts can result from sensory disturbances, especially those that could affect feeding or day-roosting. MECP has provided guidance on similar projects that indicate that the use of the appropriate avoidance measures will satisfy the agency that contravention to ESA, 2007 for SAR bats have been minimized. These measures are included below in Section 7. It is expected that if these guidelines are closely followed, the Project will have no adverse effects on SAR bats.

6.2.2 Fish and Fish Habitat

The Site includes the Scugog River and the mouth of Feature 1, an unnamed tributary. The evaluation of the presence of fish habitat in each of these is based on DFO policies.

The entire Scugog River is home to a diverse fish community and constitutes permanent, direct fish habitat. The Project is a new bridge being constructed over this river, which merits consideration of any potential effects on the quality or quantity of this habitat. As no footings are being proposed within the river's bankfull width as part of the design, there is no expected reduction in the amount of Fish habitat.

Indirect impacts to Fish Habitat in either the Scugog River or the lowest reaches of Feature 1 could occur as a result of sedimentation or release of contaminants from surrounding construction areas in the event of a flood or heavy rain during construction. Prior to mitigation measures, the magnitude of such an impact would be moderate to severe and temporary in nature, and the risk would be very high. Therefore, it will be important to follow the mitigation measures outlined in Section 7. If followed correctly, impacts are expected to be negligible, and no DFO permitting or consultation will be required under the *Fisheries Act*.

6.2.3 Woodlands and Hazard Lands

The western portion of the Site contains an area of wooded slope that will need to be cleared in order to construct the new alignment for the access road to Colborne St. W. The wooded portion to be removed is approximately 0.14 ha and is dominated by black walnut. Being a small, isolated patch of trees in an urban setting, this forest does not meet the criteria of Significant Woodland, nor is it identified on either the Town of Lindsay or City of Kawartha Lakes OP as such. However, the Town of Lindsay OP identifies this area (and the entire valleyland) as Hazard Land. These are sensitive lands that may be prone to erosion or flooding and are specially regulated. As per Section 6.2.6 of the OP, any development on or adjacent to these lands requires that a detailed delineation of the hazard land boundary is included on a Site Plan and that a description of how the Project will be able to avoid potential negative impacts to the environment is prepared. The measures outlined in the following section (particularly under Section 7.2.2 - Erosion and Sediment Control) serve as this description.

7. Avoidance and Mitigation Measures

Following a review of the background information, site investigations and evaluation of the potential natural heritage features, the following features were identified for avoidance and/or mitigation measures:

- Species at Risk Habitat
  - Potential for Blanding's Turtle
  - Potential for SAR Bats
- Fish Habitat
- Hazard Lands
- Other

- Species protected by FWCA or MBCA
- Invasive Species
- Revaluation of Butternut

The following list of avoidance and mitigation measures follows current best practices, at the time of this report, and are based on the understanding of areas of impacts and construction methods outlined above. The information below will need to be reviewed at detailed design and for permitting. No consultations with any agencies have occurred.

7.1 Species at Risk

The only two SAR brought forward following the evaluation of potential occurrence were Blanding's turtle and SAR bats. For Blanding's Turtle, there was no suitable nesting habitat noted, and aquatic habitat is assumed to be used only for migratory purposes during the spring and fall. Given that the Project's activities will be restricted to the terrestrial portion of the Site, there is a reduced potential of the Project to interact with Blanding's Turtle. The direction from MECP for SAR bats is to consider trees that are 10 cm in DBH and larger as SAR bat habitat. The Project may require the removal of trees larger than 10cm in DBH or the removal of potentially suitable structures. The following sections list the typical avoidance and mitigation measures for SAR in General and for each group.

7.1.1 General Mitigation Measures

- The potential to impact SAR (and the list of SAR) should be re-evaluated at the detailed design phase to ensure that the information provided below remains the most recent advice.
- Contractor is to be made aware that any impacts to areas identified as to be protected can result in penalties under the ESA, 2007.
- Endangered and threatened species are protected and cannot be harmed, harassed, or killed and in some cases their habitats are also protected. These individuals will only be handled by qualified person and only if the individual is in imminent threat of harm. An authorization under the ESA 2007 would be required to handle individuals that are not in imminent threat of harm.
- If a SAR enters the work area during the construction period, any work that may harm the individual is to stop immediately and the supervisor will be contacted. No work will continue until the individual has left the area.
- Should an individual be harmed or killed then work will stop, and the Ministry of Environment, Conservation and Parks (MECP) will be contacted immediately.
- Mitigation measures listed elsewhere in this report are also applicable to this section.
- If a SAR is encountered, this information will be provided to the Natural Heritage Information Centre (Report rare species (animals and plants) | Ontario.ca)

7.1.2 SAR Turtles

- Consult with MECP early with respect to the potential impacts to Blanding's Turtle.
- Educate construction workers of the potential for Blanding's Turtle to be present and that this is a protected species from harm and injury under the provincial Endangered Species Act. Ensure to inform workers that there is a high potential for the species to occur in this area.
- Educate workers, that this species is known to travel far from aquatic habitats and as such, they are to perform a mandatory daily sweep of the work area when they first arrive on-site during the turtle active season (typically April 16-October 15; timing affected by weather conditions).
- No stockpiles are anticipated on site. If this changes, then additional measures to prevent turtles from nesting in the stockpiles are recommended.
- Implement a strict speed limit of 15km/h within the Site.
- Perform daily sweeps during the active season (approximately April 1 to October 31, subject to weather conditions).
- Be vigilant in looking for the presence of turtles or other reptiles. If found allow them to leave on their own. If a suspected SAR is noted, then contact MECP or a biologist for assistance immediately.
- Turtle exclusion fencing must be installed. The sediment fencing for erosion control can also provide a temporary turtle exclusion function. The sediment fence used for turtle exclusion should be installed as per the guidelines from *Reptile and Amphibian Exclusion Fencing* (MECP, 2021). The two ends of the fence are to have a turn-around to encourage turtles to remain within the retained habitats (see the Figure 1 below taken from the guidelines).
- Turtle exclusion fencing should be installed and maintained every year prior to the beginning of May to minimize the potential for turtles to nest on site.
- If a turtle nest is suspected, then create a 30m buffer to protect the nest and contact a professional for guidance. A biologist can be contacted or Ministry of Environment, Conservation and Parks (for suspected species at risk) or Ministry of Natural Resources and Forestry (for other provincial species).

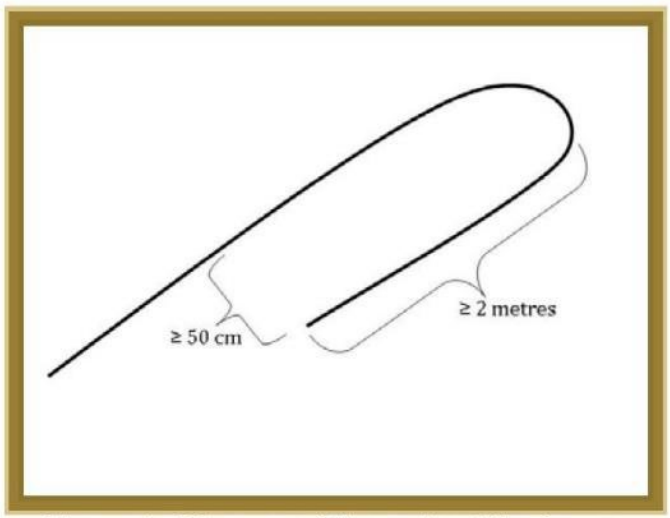

Figure 1. Diagram of the ends of the fence designed to curve inward in order to direct animals away from the area of exclusion.

7.1.3 SAR Bats

- Educate contractors by informing them that most bats in Ontario are protected.
- Remove any structures and all trees that are 10 cm in diameter at breast height or larger between October 1 and March 31 (Bat active season is currently assumed to be April 1 to September 30 in Southern Ontario as Eastern Small-footed Myotis maternity habitat is not anticipated to be present in this project area). If this is not possible, conduct exit survey prior to cutting them down. If the exit survey identifies bats, contact MECP or biologist for additional guidance.

7.2 Fish and Fish Habitat

The following mitigation measures are proposed to avoid or mitigate impacts to fish and fish habitat

7.2.1 Planning

- Minimize clearing of woody vegetation. Where possible, cut trees leaving behind a 60 cm stump or more and cut shrubs down (instead of grubbing)
- Erosion and sediment control measures will be installed prior to the clearing of vegetation within 30 m of a watercourse.
- Ensure that no activities are being carried out in the waterbody or between the waterbody and the sediment fencing.
- Ensure that the water quantity and quality reaching each feature remains the same pre and post-construction.

7.2.2 Erosion and Sediment Control

- An erosion and sediment control plan will be developed by contractor and implemented prior to any work within 30 m of the watercourse:
  - Provide regular maintenance to the erosion and sediment control measures during construction. Contractor shall be responsible for ensuring that the erosion and sediment control measures are maintained and will monitor the water clarity downstream of the work site throughout the day and during rain events. Water quality is to meet the *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. Monitoring for visible plumes outside of the work area is to be undertaken
  - At a minimum, the erosion and sediment control plan will include the installation of sediment fencing along the top of banks where vegetation clearing and/or soil disturbance will occur within 30 m of any channel prior to the removal of vegetation. And the installation of a turbidity curtain downstream
  - Additional materials (i.e., rip rap, filter cloth and silt fencing) will be readily available in case they are needed promptly for erosion and/or sediment control.
- Suspend activities that cause muddy environments during periods of heavy rains;
- Construction and removal of cofferdam dams can create a plume. As such, appropriate measures should be put in place such as placing rock for the cofferdam within erosion control measures downstream that isolates just the area where the cofferdam is being built;
- Note that if meter bags are used, they can often split when being removed as such it is preferred that gravel (washed and free of fines) be used for the metre bags;
- Any stockpiles of soil or fill material will be stored as far as possible from the channel and protected by silt fencing (minimum 30 m);
- The sediment fencing will not be removed until the bank is stabilized (i.e., <20% exposed soil);
- Any disturbed banks, outside of the areas to be piped, will be returned to pre-construction conditions and contours;
- Where banks/riparian area (area within 30 m of channel) have been stabilized by seeding and/or planting, monitor the revegetation to ensure that the vegetation becomes fully established;
- Any rock protection added below the high water mark will consist of river stone that is clean, free of fines. Riprap may be used on the banks above the high-water mark and will also be clean rock free of fines;
- Where possible, limit clearing of vegetation to trimming and leave the stump and lower 60 cm of the tree trunk in place (for shoreline stabilization).

7.2.3 Fish and Fish Habitat Protection

- Any disturbed bank, along the section to remain, will be returned to pre-construction conditions, including revegetation, as necessary, with vegetation appropriate for site conditions;
- Placement of any erosion control blankets is to avoid the area that will be wet (i.e., will be placed above the high-water level) as the mesh of the blankets can trap fish.

7.2.4 Contaminant and Spill Management

- Concrete particles and pours can affect the pH of any water that comes into contact with the material. Measures are to be put in place to capture all concrete dust and particles and waste water generated during the repairs (i.e., chipping, saw cutting, blasting etc.).
- During the concrete works (removal and any pours), all water outside of work area is to meet the minimum requirements established by CCME for the protection of aquatic life. Monitoring is to be completed by the contractor and records provided to the Owner.
  - The pH outside of the temporary work area is to be kept within the CCME guidelines (between 6.5-9.0 pH units).
  - Monitoring of water temperature is to be completed until any new concrete is cured.
- All machinery and equipment will be free of mud and plant material when arriving on-site to minimize the transport of invasive species;
- All equipment working in or near the water should be well maintained, clean and free of leaks. Maintenance on construction equipment such as refueling, oil changes or lubrication would only be permitted in designated area located at a minimum of 30 m from the shoreline in an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze, or other materials from inadvertently entering the ground or the surface water flow;
- Emergency spill kits will be located on site. The crew will be fully trained on the use of clean-up materials to minimize impacts of any accidental spills. The area would be monitored for leakage and in the unlikely event of a minor spillage the Project manager would halt the activity, and corrective measures would be implemented;
- If a spill occurs:
  - Stop all work;
  - Spills are to be immediately reported to the MECP Spills Action Centre (1800 268-6060). Note that under the *Fisheries Act* deleterious substance includes sediments;
  - Clean-up measures are to be appropriate and are not to result in further harm to fish/fish habitat;
  - Sediment-laden water will be removed and disposed of appropriately.

- No construction debris will be allowed to enter the watercourse;
- Following the completion of construction, all construction materials will be removed from site.

7.3 Other

In addition to the items listed above, it is important to note that there are other acts and regulations which may apply. The following measures provide additional information on avoidance and mitigation which must occur to reduce the potential of contravening other legislations. This list should not be considered exhaustive.

- Almost all breeding birds are protected under the MBCA and/or FWCA. The only species not protected are: American crow, brown-headed cowbird, common grackle, house sparrow, red-winged blackbird, and starling. It is prohibited to destroy or disturb an active nest of other birds, or to take or handle nests, eggs, or nestlings. In this part of Ontario, the current standard nesting period is between April 5 to August 28. Outside of this timing window, it is considered unlikely that birds would be nesting. Note, there are some birds (birds of prey, herons etc.) that do begin nesting earlier in the year. It should also be noted, that if an active nest is present before or after the above dates that it is still protected.
- Most turtles are protected under the FWCA. If a turtle nest is suspected, then flag a 10 m buffer to protect the nest. Contact MECP (for SAR) and MNRF (all other species).
- Machinery should be cleaned prior to arriving on-site to prevent the potential spread of invasive species. Invasive species on site (i.e., common reed, common buckthorn, honeysuckle) should be removed as appropriate for the species. See Ontario Invasive Species website (https://www.ontario.ca/page/invasive-species-ontario).
- Minimize sensory impacts to fauna by working during the day and ensuring that equipment and vehicles have the appropriate mufflers and implement a no idling policy. If working at night, ensure that only the lighting needed to perform the work safely is installed and this lighting is focused on the work area (minimize lighting of sky).
- The shelf-life of Butternut surveys is 2-years. Additional surveys will need to be completed to confirm presence/absence of butternut within 50 m of the areas to be impacted at the time of detailed design when the exact limits of activities are known. If a new Butternut assessment is required, it must be during the green-leaf period which is typically between mid-May to mid-August).
- Follow guidance on clearing of vegetation from bats and birds and Other sections.

8. Conclusion

This EIS provides an analysis of the potential impacts to the natural heritage features that may result from the proposed construction of the Colborne Street Bridge and associated infrastructure. There were several significant or assumed significant natural heritage features identified (habitat of endangered or threatened species, and fish habitat) along with a need to prevent contravention of other legislation (i.e., MBCA, FWCA). **Note the following important timelines:**

- Turtle Active Season – April 1 to October 31, inclusive (implement turtle exclusion fencing, monitoring for individuals etc.)
- Bat Active Season – April 1 to September 30, inclusive (no removal of trees that are 10 cm or larger in diameter without additional measures, and no removal of potentially suitable structures).
- MECP will need to be consulted with respect to Blanding's Turtle.
- An updated Butternut sweep will likely be required prior to construction because the 2023 Butternut survey will have expired. It is not expected that any Butternuts are present.

Based on current guidelines, and pending comments from reviewing agencies, and provided that the measures outlined herein are properly implemented, impacts to the natural environment can be minimized and the ecological functions of the surrounding natural environment maintained.

9. Study Limitations and Constraints

CIMA+ completed diligent and reasonable research in the conduct of this evaluation, with respect to the recognized laws and standards of practice.

The facts presented in this report are strictly limited to the period of investigation. The conclusions presented in this report are based on the available information and documents, the observations made during the Site visit and the information obtained from communications with various contacts. The interpretation presented in this report is limited to this data.

CIMA+ is not responsible for erroneous conclusions due to voluntary abstention or the non-availability of pertinent information. Any opinion expressed in relation to legal or regulatory conformity is technical and should not be, in any case, considered as legal advice.

10. References

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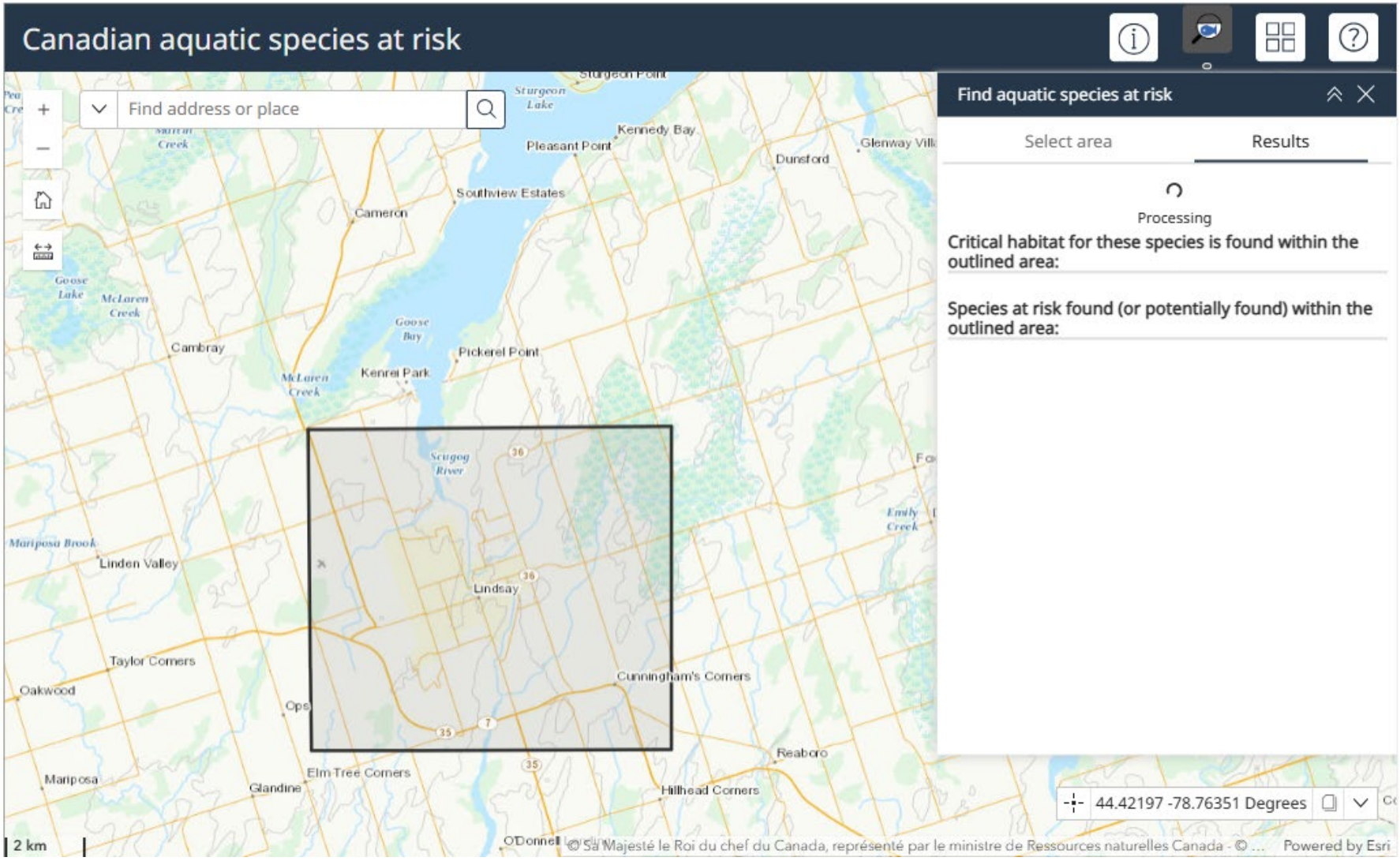
A

Appendix A
Canadian Aquatic Species At Risk Map Showing Absence of SAR or Critical Habitat in Project Area


Canadian aquatic species at risk
Find address or place
Find aquatic species at risk
Select area
Results
Processing
Critical habitat for these species is found within the outlined area:
Species at risk found (or potentially found) within the outlined area:
Sturgeon Point
Sturgeon Lake
Kennedy Bay
Pleasant Point
Dunsford
Glenway Vill
Southview Estates
Cameron
Goose Lake
McLaren Creek
Goose Bay
Cambray
Pickerel Point
Kenrei Park
Scugog River
Emily Creek
Mariposa Brook
Linden Valley
Lindsay
Taylor Corners
Oakwood
Cunningham's Corners
Ops
Reabora
Mariposa
Glandine
Elm Tree Corners
Hillhead Corners
O'Donnell
44.42197 -78.76351 Degrees
2 km
© Sa Majesté le Roi du chef du Canada, représenté par le ministre de Ressources naturelles Canada - © ...
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Stage 1 Archaeological Assessment Colborne Street Bridge (Lots 21-22, Concessions 5-6, Geographical Ops Township, County of Victoria) City of Kawartha Lakes

Original Report

Prepared for:

CIMA+
112-4096 Meadowbrook Drive
London Ontario N6L 1G4

Archaeological Licence: P094 (Merritt)
PIF P094-0350-2023
Archaeological Services Inc. File: 22EA-266

December 1, 2025

Executive Summary

Archaeological Services Inc. was contracted by CIMA+, on behalf of the City of Kawartha Lakes, to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Colborne Street Bridge Detailed Design project. This project involves the creation of a new bridge crossing over the Scugog River that would connect Colborne Street West and Colborne Street East in the former Town of Lindsay. The Stage 1 Study Area involves an area bounded approximately by William Street North to the west, Lindsay Street North and St. Paul Street to the east, Elgin Street to the north, and Bond Street East to the south.

The Stage 1 background study determined one previously registered archaeological site is located within one kilometre of the Study Area, which is located within the Study Area and does not retain cultural heritage value or interest. The property inspection determined that parts of the Study Area exhibit archaeological potential and will require archaeological assessment.

The following recommendations are made:

1) Parts of the Study Area exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals. Stage 2 is required prior to any proposed construction activities on these lands;

2) The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, slopes in excess of 20 degrees, or being previously assessed. These lands do not require further archaeological assessment; and,

3) Should the proposed work extend beyond the current Study Area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

Project Personnel

- **Principal**: Lisa Merritt, MSc. (P094) Principal, Infrastructure
- **Senior Project Manager**: Sarah Jagelewski, BA Hons (R405), Lead Archaeologist, Manager, Infrastructure
- **Division Coordinator**: Katrina Thach, BA Hons. (R1225), Associate Archaeologist, Assistant Manager, Infrastructure
- **Project Administrator**: Catherine Kitchen, BA, Archaeologist (R1364), Project Administrator, Infrastructure
- **Project Director**: Lisa Merritt
- **Project Manager**: Eliza Brandy, MA (R1109), Lead Archaeologist, Project Manager, Infrastructure
- **Field Director**: Caitlin Lacy, BA (R303), Lead Archaeologist, Project Manager, Infrastructure
- **Report Preparation**: Danielle Bella, BA Hons, Archaeologist, Technical Writer, Infrastructure
- **Graphics**: Carolyn Nettleton, BA, Archaeologist, GIS Technician, Operations
- **Report Review**: Eliza Brandy, Lisa Merritt

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1.0 Project Context

Archaeological Services Inc. (ASI) was contracted by CIMA+, on behalf of the City of Kawartha Lakes, to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Colborne Street Bridge Detailed Design project. This project involves the creation of a new bridge crossing over the Scugog River that would connect Colborne Street West and Colborne Street East in the former Town of Lindsay.

A Class Environmental Assessment and Preliminary Design study (referred to as the Environmental Study Report) for the new bridge crossing over the Scugog River was previously undertaken by the County of Victoria (now the City of Kawartha Lakes) in 1994. This study resulted in the Colborne Street right-of-way being selected as the preferred location for the new bridge crossing. The report further recommended a two phase strategy that included widening of the existing Wellington Street bridge, which was completed in 1995, and the construction of a Colborne Street bridge crossing when crossing demand reached 26,800 vehicles per day. When the demand threshold was met, an amendment to the original 1994 Environmental Study Report was undertaken in 2000 to document and evaluate the anticipated environmental effects of the new bridge crossing and methods to minimize potential impacts. This report is referred to as the Addendum to the 1994 Environmental Study Report (Cole, Sherman and Associates, 2000).

Based on proposed designs for the Colborne Street Bridge (see Appendix A), the Addendum confirmed the findings of the 1994 Environmental Study Report that no historical structures would be affected by the proposed bridge crossing on Colborne Street.

The Stage 1 Study Area involves an area bounded approximately by William Street North to the west, Lindsay Street North and St. Paul Street to the east, Elgin Street to the north, and Bond Street East to the south (Figure 1).

All activities carried out during this assessment were completed in accordance with the *Ontario Heritage Act* (R.S.O. c. O.18, 1990, as amended in 2025) and the 2011 *Standards and Guidelines for Consultant Archaeologists* (S & G),

currently administered by the Ministry of Citizenship and Multiculturalism (MCM, 2011).

1.1 Development Context

All work has been undertaken as required by the *Environmental Assessment Act* (R.S.O. c. E.18, 1990, as amended in 2025) and regulations made under the Act, and are therefore subject to all associated legislation. This project is being conducted in accordance with the *Municipal Class Environmental Assessment* process (Municipal Engineers Association, 2023).

Authorization to carry out the activities necessary for the completion of the Stage 1 archaeological assessment and property inspection was granted by CIMA+ on March 23, 2023.

1.1.1 Treaties

The Study Area is within Treaty 20 the Rice Lake Purchase of 1818, and the Williams Treaties of 1923, on the treaty and traditional territory of the Michi Saagiig and Chippewa Nations, collectively known as the Williams Treaties First Nations, including the Mississaugas of Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Scugog Island First Nation and the Chippewas of Beausoleil First Nation, Georgina Island First Nation and the Rama First Nation (Williams Treaties First Nations, 2017). In October and November of 1923, the governments of Canada and Ontario, chaired by A.S. Williams, signed treaties with the Chippewa and Mississauga for three large tracts of land in central Ontario and the northern shore of Lake Ontario which had never been included in previous treaties (Crown-Indigenous Relations and Northern Affairs, 2013). Part of the Williams Treaties area includes lands originally negotiated under the Rice Lake Treaty, Treaty No. 20, signed on November 5, 1818 between the Mississaugas in the Rice Lake area and the Crown, which opened up colonization for settlers (Crown-Indigenous Relations and Northern Affairs, 2016).

In 2018 the Government of Canada reached a settlement with the Williams Treaties First Nations reaffirming the recognized Treaty harvesting rights in the Williams Treaties territories of each of the seven nations.

1.2 Historical Context

1.2.1 Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years before present (B.P.) (Ferris, 2013). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 B.P., the environment had progressively warmed (Edwards & Fritz, 1988) and populations now occupied less extensive territories (Ellis & Deller, 1990).

Between approximately 10,000-5,500 B.P., the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines are now submerged. This period produces the earliest evidence of heavy wood working tools, an indication of greater investment of labour in felling trees for fuel, to build shelter, and watercraft production. These activities suggest prolonged seasonal residency at occupation sites. Polished stone and native copper implements were being produced by approximately 8,000 B.P.; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest evidence for cemeteries dates to approximately 4,500-3,000 B.P. and is indicative of increased social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (Brown, 1995, p. 13; Ellis et al., 1990, 2009).

Between 3,000-2,500 B.P., populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. The Woodland period begins around 2,500 B.P. and exchange and interaction networks broaden at this time (Spence et al., 1990, pp. 136, 138) and by approximately 2,000 B.P., evidence exists for small community camps, focusing on the seasonal harvesting of resources (Spence et al., 1990, pp. 155, 164). By 1,500 B.P. there is macro botanical evidence for maize in southern Ontario, and it is thought that maize only supplemented people's diet. There is earlier phytolithic evidence for maize in central New York State by 2,300 B.P. – it is likely that once similar analyses are conducted on Ontario ceramic vessels of the

same period, the same evidence will be found (Birch & Williamson, 2013, pp. 13–15). As is evident in detailed Anishinaabek ethnographies, winter was a period during which some families would depart from the larger group as it was easier to sustain smaller populations (Rogers, 1962). It is generally understood that these populations were Algonquian-speakers during these millennia of settlement and land use.

From the beginning of the Late Woodland period at approximately 1,000 B.P., lifeways became more similar to that described in early historical documents. Between approximately 1000-1300 Common Era (C.E.), the communal site is replaced by the village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson, 1990, p. 317). By 1300-1450 C.E., this episodic community disintegration was no longer practised and populations now communally occupied sites throughout the year (Dodd et al., 1990, p. 343). By the mid-sixteenth century these small villages had coalesced into larger communities (Birch et al., 2021). Through this process, the socio-political organization of the First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed.

By 1600 C.E., the communities within Simcoe County had formed the Confederation of Nations encountered by the first European explorers and missionaries. In the 1640s, devastating epidemics and the traditional enmity between the Haudenosaunee and the Wendat (and their Algonquian allies such as the Nippissing and Odawa) led to the dispersal of the Wendat from southern Ontario. Shortly afterwards, the Haudenosaunee established a series of settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario. By the 1690s however, the Anishinaabeg were the only communities with a permanent presence in southern Ontario. From the beginning of the eighteenth century to the assertion of British sovereignty in 1763, there was no interruption to Anishinaabeg control and use of southern Ontario.

1.2.2 Post-Contact Settlement

Historically, the Study Area is located in the Geographical Ops Township, County of Victoria in Lots 21-22 Concessions 5-6.

The S & G stipulates that areas of early Euro-Canadian settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches, and early cemeteries are considered to have archaeological potential. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed on a municipal register or designated under the Ontario Heritage Act or a federal, provincial, or municipal historic landmark or site are also considered to have archaeological potential.

For the Euro-Canadian period, the majority of early nineteenth century farmsteads (i.e., those that are arguably the most potentially significant resources and whose locations are rarely recorded on nineteenth century maps) are likely to be located in proximity to water. The development of the network of concession roads and railroads through the course of the nineteenth century frequently influenced the siting of farmsteads and businesses. Accordingly, undisturbed lands within 100 metres of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed Indigenous pathways and set up trading posts at strategic locations along the well-traveled river routes. All of these occupations occurred at sites that afforded both natural landfalls and convenient access, by means of the various waterways and overland trails, into the hinterlands. Early transportation routes followed existing Indigenous trails, both along the lakeshore and adjacent to various creeks and rivers (ASI 2006).

Community of Lindsay

The community of Lindsay is in the centre of Ops Township on the Scugog River between Lake Scugog and Sturgeon Lake. It was originally a portage place called *Onigahning,* Anishinaabemowin for ‘the portage’ (Scott, 1997:122). After

settlement was opened for the Township of Ops in 1825, the first settlers, William Purdy and his sons, Jesse and Hazard, arrived from the United States (Mika and Mika, 1981:541). They built a dam on the Scugog River two years later, followed by a sawmill in 1829 and a grist mill in 1830. A community developed around the complex, known as Purdy's Mills, which included a log house and tavern built by Jeremiah Britton and his two sons, Charles and Wellington, stores kept by Thomas Snowden and Major Thomas Murphy, and a carding mill operated by Mr. Fulford.

In 1834, John Houston (or Huston) surveyed the settlement, plotting out streets and lots for a town. It is believed that during the survey, a man named John Lindsay was shot in the leg and subsequently died of infection and was buried beside the river (Rayburn, 1997:193). Houston entered Lindsay's name and date of death on his surveyor's plan, and the name was officially accepted for the town. In 1837, William and Jessie Purdy left Purdy's Mills. The following year, the Purdy dam caused a flood in the surrounding region, which inundated some 60,000 acres. At the behest of the angry local farmers, Hazard Purdy lowered the dam and plans were made to build a lock which was completed in 1844. This opened up the possibility of navigation of the river by boat. By the mid-nineteenth century, the population of Lindsay had risen to 300 and several stores, a tannery, a potashery and iron foundry had been established. When the railway connected the town in 1857, the population burgeoned to 1,100 and the town limits were expanded. By the 1860s, high school education was offered at one of the two local public schools, and the town had a new Town Hall, a courthouse and jail, and an Opera House (Mika and Mika, 1981:543). The late nineteenth century, gas streetlamps were installed, as well as electricity.

In 2001, the Town of Lindsay dissolved and merged with other nearby communities into the City of Kawartha Lakes (Tikkanen, 2016).

Midland Railway

In 1846, the Peterborough and Port Hope Railway Company was planned to run from Port Hope to Peterborough around Rice Lake. Initially growth of the rail line was slow due to financial issues and a new charter was issued in 1854 for the Port Hope, Lindsay, and Beaverton Railway Company. Four years later the

company constructed a branch line from Millbrook to Peterborough. The railway changed its name to the Midland Railway of Canada in 1869 when it planned for expansion to Beaverton and beyond. During the 1880s, following a decade of growth the company was in financial difficulties, as were other rail lines, and in 1882, a merger of six rail road companies under the Midland Railway of Canada saw its total mileage swell from 144 miles to 465 miles (Toronto Railway Historical Association, 2020).

The abandonment of the original mainline between Omemee and Millbrook Junction occurred in 1882 when the company decided to build a direct line between Peterborough and Omemee. The company was later taken over by the Grand Trunk Railroad in 1893 and subsequently the Canadian National Railway in 1923 (Andreae, 1997; Toronto Railway Historical Association, 2020). Portions of the rail corridor began to be abandoned as early as 1928, with the majority being abandoned and the tracks removed after 1960. Most of this line is now preserved as part of the trail network in Ontario.

1.2.3 Map Review

The 1877 *Map of the County of Victoria* (Patterson, 1877), 1879 Town of Lindsay map in the *Illustrated Atlas of the Dominion of Canada* (Belden, 1881), 1881 *Victoria Supplement in Illustrated Atlas of the Dominion of Canada* (Belden, 1881), 1911 Fire Insurance Plans of Lindsay , 1938 topographic map Lindsay sheet (Department of National Defence, 1938), and the 1999 National Topographic Series Lindsay sheet (Natural Resources Canada, 1999) were examined to determine the presence of historic features within the Study Area during the nineteenth and twentieth centuries (Figures 2-6).

The 1877 map (Figure 2), 1879 map (Figure 3), and 1881 map (Figure 4) depict the Study Area within the community of Lindsay. William Street North, Elgin Street, Regent Street, Colborne Street West/East, Francis Street, and Lindsay Street North are shown to have been historically surveyed roads within the Study Area. The Midland Railway travels in a north-south direction through the Study Area along the western bank of the Scugog River, before crossing the river north of the Study Area, and re-entering the Study Area along the eastern bank. The 1879 map shows a railway lumber yard and a sawmill on the eastern bank.

The 1911 map includes coverage of most of the Study Area except the block along the river between Elgin Street and Regent Street (Figure 5). Block 102 is between Elgin Street and Regent Street, east of William Street. Within Block 102, 14 houses and 16 sheds are depicted. Block 21 is between Regent Street and Colborne Street (spelled "Colbourne" on the Fire Insurance Plan), east of William Street. There are 21 houses and eight sheds shown in this block. Block 92 is between Colborne Street and Francis Street, east of William Street. Two houses are shown on the northwest corner of the block. An office building is shown in the southeast corner of the block, in the location of 130 William Street North. A lumber shed is shown south of Colbourne Street. Scattered piles of lumber are shown near the middle of the block. West of William Street is Block 93, with two structures and a shed in the location of 123 William Street North. The east sides of Blocks 21 and 92 end at slope. A railway follows Scugog River on its west bank. West of the railway is a lumber shed and piles of cordwood and slabs. East of the rail are three shingle sheds, piles of logs, piles of shingles, and the J. Carew Lumber Co. Ltd sawmill. Block 101 is east of Scugog River. It includes Madison Williams MFG Co Limited, consisting of a foundry, machine shop, several storage buildings, and several scattered piles of lumber. Ten boat houses are shown on the eastern riverbank.

The 1938 map (Figure 6) shows the Midland Railway, now labelled the Canadian National Railway along the western bank of Scugog River. An abandoned rail line and the Canadian Pacific Railway run along the eastern bank of Scugog River. A mill or factory is depicted on the western bank between Regent Street and Colborne Street. Residential structures are shown densely built along William Street North, Elgin Street, Regent Street, Colborne Street West, Francis Street, and the western side of Lindsay Street North.

The 1999 map (Figure 7) shows three large buildings, matching the locations of the present-day apartment buildings and retirement residence, on the western bank of Scugog River. Greenspace is depicted along the eastern bank, and red shading denotes dense population within the community. The Canadian Pacific Railway is shown in the eastern part of the Study Area.

1.2.4 Aerial and Orthoimagery Review

Historical aerial imagery from 1954 (Hunting Survey Corporation Limited, 1954) shows the Canadian Pacific Railway within the Study Area, two rail spurs branch off and end along the eastern bank of Scugog River (Figure 8). The grid of residential downtown Lindsay is shown within the western portion of the Study Area and ending prior to the slope down to the west bank of Scugog River.

A review of available Google satellite imagery shows construction of the sewage pumping station between Colborne Street North and the west bank of Scugog River, and the east bank and Lindsay Street North in 2018 and 2019 (Image 23 to Image 24). These disturbed areas line up with the contractor working areas for the Rivera Park Sewage Pumping Station (see *Appendix A*), only part of which were previously subject to archaeological assessment (see Section 1.3.3). The rest of the Study Area remained relatively unchanged between 2007 and 2020.

1.3 Archaeological Context

This section provides background research pertaining to previous archaeological fieldwork conducted within and in the vicinity of the Study Area, its environmental characteristics (including drainage, soils or surficial geology and topography, etc.), and current land use and field conditions. Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites available online from the MCM through “Ontario’s Past Portal”; published and unpublished documentary sources; and the files of ASI.

1.3.1 Geography

In addition to the known archaeological sites, the state of the natural environment is a helpful indicator of archaeological potential. Accordingly, a description of the physiography and soils are briefly discussed for the Study Area.

The S & G stipulates that primary water sources (lakes, rivers, streams, creeks, etc.), secondary water sources (intermittent streams and creeks, springs, marshes, swamps, etc.), ancient water sources (glacial lake shorelines indicated

by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches, etc.), as well as accessible or inaccessible shorelines (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.) are characteristics that indicate archaeological potential.

Water has been identified as the major determinant of site selection and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario since 5,000 B.P. (Karrow & Warner, 1990, fig. 2.16), proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

Other geographic characteristics that can indicate archaeological potential include elevated topography (eskers, drumlins, large knolls, and plateaux), pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground, distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings. Resource areas, including; food or medicinal plants (migratory routes, spawning areas) are also considered characteristics that indicate archaeological potential (S & G, Section 1.3.1).

The Study Area is located within the drumlinized till plains of the Peterborough Drumlin Field physiographic region of southern Ontario (Chapman & Putnam, 1984). The Peterborough Drumlin Field extends from Simcoe County east to Hastings County and is generally characterized by rolling till plains overlying limestone bedrock. The region is approximately 4,532 square kilometres and contains over 3000 drumlins in addition to many other drumlinoid hills and surface flutings (Chapman & Putnam, 1984). The drumlins are composed of highly calcareous till but there are local differences in composition. The till plains of the regions were formed during the retreat of the Lake Ontario ice lobe

of the Laurentide glacier, and they indicate directionality of glacial advance and retreat. Till is produced from the advance of continental glacial ice. Soil and rock is carried forward by the ice, mixed and milled, producing a heterogeneous soil which is characteristic of glaciations (Chapman & Putnam, 1984).

Figure 9 Figure 9depicts surficial geology for the Study Area which demonstrates that the Study Area is underlain by stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain (Ontario Geological Survey, 2010).

Soil types within the Study Area include Solmesville clay loam, a grey-brown podzolic with imperfect drainage and Bottomland, with variable drainage. Drainage is illustrated on Figure 10.

The Scugog River and a side channel called Sinister Creek, constructed off the east side of Scugog River, are within the Study Area. The Scugog River is located between Lake Scugog and Sturgeon Lake and is 85 kilometres in length (Kawartha Conservation, 2023, 2020).

1.3.2 Previously Registered Archaeological Sites

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database maintained by the MCM. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 kilometres east to west, and approximately 18.5 kilometres north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The Study Area under review is located in Borden block *BcGq.*

According to the Ontario Archaeological Sites Database, one previously registered archaeological site is located within one kilometre of the Study Area, which is located within the Study Area and does not retain cultural heritage value or interest (MCM 2023). A summary of the site is provided below in Table 1.

Table 1: Registered Sites within One Kilometre of the Study Area

Borden number	Site Name	Temporal/ Cultural Affiliation	Site type	Researcher
BcGq-15	Carew	Euro-Canadian	Midden	Earthworks Archaeological Services 2020

1.3.3 Previous Archaeological Assessments

ASI reviewed previous archaeological assessments that detail fieldwork within 50 metres of the Study Area. Only those specific archaeological assessments of direct relevance to the present undertaking other will be included here:

(ASI 1991) Stage One Archaeological Assessment of Scugog River Crossing Town of Lindsay Victoria County, Ontario. Licence #91-015. and (ASI 1992) Stage Two Archaeological Assessment of the Scugog River Crossing Colborne Street Town of Lindsay, Ontario. Licence #90-021.

This project was undertaken for the Scugog River bridge crossing for the County of Victoria (now the City of Kawartha Lakes) in 1994. The project area overlaps the current Study Area where Colborne Street meets the Scugog River. The Stage 1 archaeological assessment recommended Stage 2 archaeological assessment. As such, Stage 2 test pit survey was conducted at five metre intervals but did not result in the recovery of cultural remains. It was recommended that the project area be cleared of further archaeological concern.

(York North Archaeological Services Inc., 2016) Stage 1-2 Archaeological Assessment for the Colborne Street SPS Project, Located in Part of Lots 21 & 22, Con. 5 &6, City of Kawartha Lakes (Former Township of Ops. Town of Lindsay), Ontario. P156-0241-2015, P156-0243-2015.

The project area overlaps the current Study Area north and south of Colborne Street, to the west and east of Scugog River for the planned sewage pumping station. Part of the project area was visually assessed to be disturbed. Test pit survey was conducted at five metre intervals within areas of archaeological potential, which did not result in the recovery of cultural remains. It was recommended that the project area be cleared of further archaeological concern.

(Earthworks Archaeological Services Inc., 2020) Stage 1-2 Archaeological Assessment 170 William Street North Part of Lot 1 & 2. Block J Registered Plan No. 1 Part of Lot 22, Concession 5 Geographic Township of Ops City of Kawartha Lakes. P321-0189-2020.

The project area overlaps the current Study Area at 170 William Street North. Test pit survey at five metre intervals located the Carew site (BcGq-15). The assemblage of 228 artifacts were recovered from 33 test pits and one one-metre test unit over an area of area of 17.5 metres by 18 metres. The largest portion of the assemblage consists of architectural class material, followed by foodways such as ceramic tableware and glass beverage containers. The site was determined to date from the late nineteenth century to present day, and to be insufficient to meet the S & Gs for Stage 3 archaeological assessment. It was recommended that no further archaeological assessment be required for the subject property or the Carew site (BcGq-15).

2.0 Property Inspection

2.1 Field Methods

A Stage 1 property inspection must adhere to the S & G, Section 1.2, Standards 1-6, which are discussed below. The entire property and its periphery must be inspected. The inspection may be either systematic or random. Coverage must be sufficient to identify the presence or absence of any features of archaeological potential. The inspection must be conducted when weather conditions permit good visibility of land features. Natural landforms and watercourses are to be confirmed if previously identified. Additional features such as elevated topography, relic water channels, glacial shorelines, well-drained soils within heavy soils and slightly elevated areas within low and wet areas should be identified and documented, if present. Features affecting assessment strategies should be identified and documented such as woodlots, bogs or other permanently wet areas, areas of steeper grade than indicated on topographic mapping, areas of overgrown vegetation, areas of heavy soil, and recent land disturbance such as grading, fill deposits and vegetation clearing. The inspection should also identify and document structures and built features that will affect assessment strategies, such as heritage structures or landscapes, cairns, monuments or plaques, and cemeteries.

The Stage 1 archaeological assessment property inspection was conducted under the field direction of Caitlin Lacy (R303) of ASI, on Friday April 21, 2023, in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the Study Area. It was a systematic visual inspection from publicly accessible lands/public right-of-ways only and did not include excavation or collection of archaeological resources. Fieldwork was conducted when weather conditions were deemed clear with good visibility (partly cloudy and 10 degrees Celsius), per S & G Section 1.2., Standard 2. Field photography is presented in Section 7.1 (Image 1 to Image 22), and field observations are overlaid onto the existing conditions of the Study Area in Section 8.0 (Figure 11).

2.2 Current Land Use and Field Conditions

The Study Area is located within downtown Lindsay and is generally bound by William Street North to the west, Lindsay Street North and St. Paul Street to the east, Elgin Street to the north, and Bond Street East to the south. William Street North is a north-south two-way one lane per direction road with curbs and sidewalks on both sides. One property, 123 William Street North, is within the Study Area west of William Street North. Colborne Street West is a north-south two-way one lane per direction road which lacks curbs and is bound by the western banks of Scugog river on its eastern side. Residential homes are within the western portion of the Study Area prior to a hill. Two apartment buildings are within the Study Area at the bottom of the hill, off Colborne Street West. A retirement home is in the southeast corner of Colborne Street West and William Street North. An extension of Rivera Park has been constructed on the eastern bank of Scugog River. Sinister Creek has been straightened and lined with stone blocks and gravel within the park area. A bridge over the creek allows passage from the older section north of the Study Area into the newer expanded area. The park has been graded and includes landscaped greenspace, gravel paths, and a parking lot. The Rivera Park Sewage Pumping Station is between Lindsay Street North and the park area. Lindsay Street North enters the Study Area from the east in a west-east alignment before curving and continuing south in a north-south alignment. The road is a two-lane curbed road with one lane per direction of traffic with a sidewalk along its western side.

3.0 Analysis of Archaeological Potential

The S & G, Section 1.3.1, lists criteria that are indicative of archaeological potential. The Study Area meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites (BcGq-15);
- Water sources: primary, secondary, or past water source (Scugog River, Sinister Creek);
- Proximity to early settlements (historical centre of Lindsay); and

- Early historic transportation routes (Midland Railway, William Street North, Elgin Street, Regent Street, Colborne Street West/East, Francis Street, Lindsay Street North)

According to the S & G, Section 1.4 Standard 1e, no areas within a property containing locations listed or designated by a municipality can be recommended for exemption from further assessment unless the area can be documented as disturbed. The Municipal Heritage Register was consulted and two properties within the Study Area are Listed or Designated under the *Ontario Heritage Act*:

- 4 Colborne Street East (Figure 11: dashed outline in pink) is designated under Part IV of the Ontario Heritage Act. Part of this property requires Stage 2 test pit survey.
- 125 William Street North (Figure 11: dashed outline in black) is listed on the municipal heritage register. Part of this property requires Stage 2 test pit survey.
- 130 William Street North (Figure 11: dashed outline in black) is listed on the municipal heritage register. The property does not exhibit archaeological potential.

The property inspection determined that parts of the Study Area exhibit archaeological potential. These areas will require Stage 2 archaeological assessment prior to any construction activities or other proposed impacts. According to the S & G Section 2.1.2, test pit survey is required on terrain where ploughing is not viable, such as wooded areas, properties where existing landscaping or infrastructure would be damaged, overgrown farmland with heavy brush or rocky pasture, and narrow linear corridors up to 10 metres wide (Image 1-Image 2, Image 5-Image 7, Image 9-Image 11; Figure 11: areas highlighted in green).

Part of the Study Area has been previously assessed and does not require further archaeological assessment (Figure 11: areas highlighted in orange).

A combination of property inspection and assessment of topographic mapping (ESRI 2022) determined that some of lands within the Study Area are sloped in excess of 20 degrees, and according to the S & G Section 2.1 do not retain

potential (Image 3, Image 7; Figure 11: areas highlighted in light pink). These areas do not require further survey.

Part of the Study Area includes Scugog River (Figure 11: area highlighted in blue). The potential for marine archaeological resources has not been evaluated as part of this land based archaeological assessment report. If impacts to the riverbed are proposed, marine archaeological potential will be evaluated through a separate process following the MCM's (2016) *Criteria For Evaluating Marine Archaeological Potential* checklist.

Part of the Study Area has been subjected to deep soil disturbance events due to construction of road rights-of-way, the late twentieth century construction of the apartment buildings and retirement residence on the western bank of Scugog River, the construction of a side channel off Scugog River, the construction and removal of the Canadian Pacific Railway Canadian National Railway, the grading of Rivera Park and construction of a pump station, and grading on the western bank of Scugog River opposite of 2 Colborne Street West. According to the S & G Section 1.3.2 these areas do not retain archaeological potential (Image 1-Image 9, Image 12-Image 22; Figure 11: areas highlighted in yellow) and do not require further survey.

3.1 Conclusions

The Stage 1 background study determined one previously registered archaeological site is located within one kilometre of the Study Area, which is located within the Study Area and does not retain cultural heritage value or interest. The property inspection determined that parts of the Study Area exhibit archaeological potential and will require Stage 2 archaeological assessment.

4.0 Recommendations

The following recommendations are made:

1) Parts of the Study Area exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals

(Figure 11: areas highlighted in green). Stage 2 is required prior to any proposed construction activities on these lands;

2) The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, slopes in excess of 20 degrees, or being previously assessed. These lands do not require further archaeological assessment; and,

3) Should the proposed work extend beyond the current Study Area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

NOTWITHSTANDING the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Archaeology Programs Unit of the Ministry of Citizenship and Multiculturalism should be immediately notified.

The above recommendations are subject to Ministry approval, and it is an offence to alter any archaeological site without Ministry of Citizenship and Multiculturalism concurrence. No grading or other activities that may result in the destruction or disturbance of any archaeological sites are permitted until notice of MCM approval has been received.

5.0 Advice on Compliance with Legislation

- This report is submitted to the Minister as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all

matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

- It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.
- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.
- The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Services Delivery.
- Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

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7.0 Images

7.1 Field Photography

Image 1: Stage 2 survey is required on lawns west of the disturbed William Street North right-of-way.

Image 2: Stage 2 survey is required on lawns south of the disturbed Elgin Street right-of-way.

Image 3: Area east of Elgin Street is sloped, no potential.

Image 4: Parking lot is disturbed, no potential.

Image 5: Land west of Scugog River requires Stage 2 survey.

Image 6: Stage 2 survey is required on lawns west of the disturbed William Street North right-of-way.

Image 7: Stage 2 survey is required on lawns beyond the disturbed Regent Street right-of-way, prior to slope.

Image 8: Parking lot is disturbed and lands up to Regent Street are sloped, no potential.

Image 9: Land east of disturbed Colborne Street West right-of-way and on either side of disturbed paved path requires Stage 2 survey.

Image 10: Area requires Stage 2 survey.

Image 11: Area requires Stage 2 survey.

Image 12: Apartment building property is disturbed, no potential.

Image 13: William Street rights-of-way are disturbed, no potential.

Image 14: Road and residential area are disturbed, no potential; Grass area beside 130 William Street North requires Stage 2 survey.

Image 15: Colborne Street and retirement residence are disturbed, no potential.

Image 16: Area is disturbed from former railway construction and removal, no potential.

Image 17: Sinister Creek channel is disturbed, no potential.

Image 18: Colborne Street East is disturbed, no potential.

Image 19: Area is disturbed from previous grading for Rivera Park, no potential.

Image 20: Area is disturbed from previous grading for Rivera Park, no potential.

Image 21: Area is disturbed from previous grading for Rivera Park, no potential.

Image 22: Lindsay Street North is disturbed, no potential.

7.2 Historical Imagery

Image 23: Google Earth Imagery showing construction east of Colborne Street West and west of Lindsay Street North in 2018

Image 24: Google Earth Imagery showing construction east of Colborne Street West and west of Lindsay Street North in 2018 (Google Earth Pro, 2021).

8.0 Maps

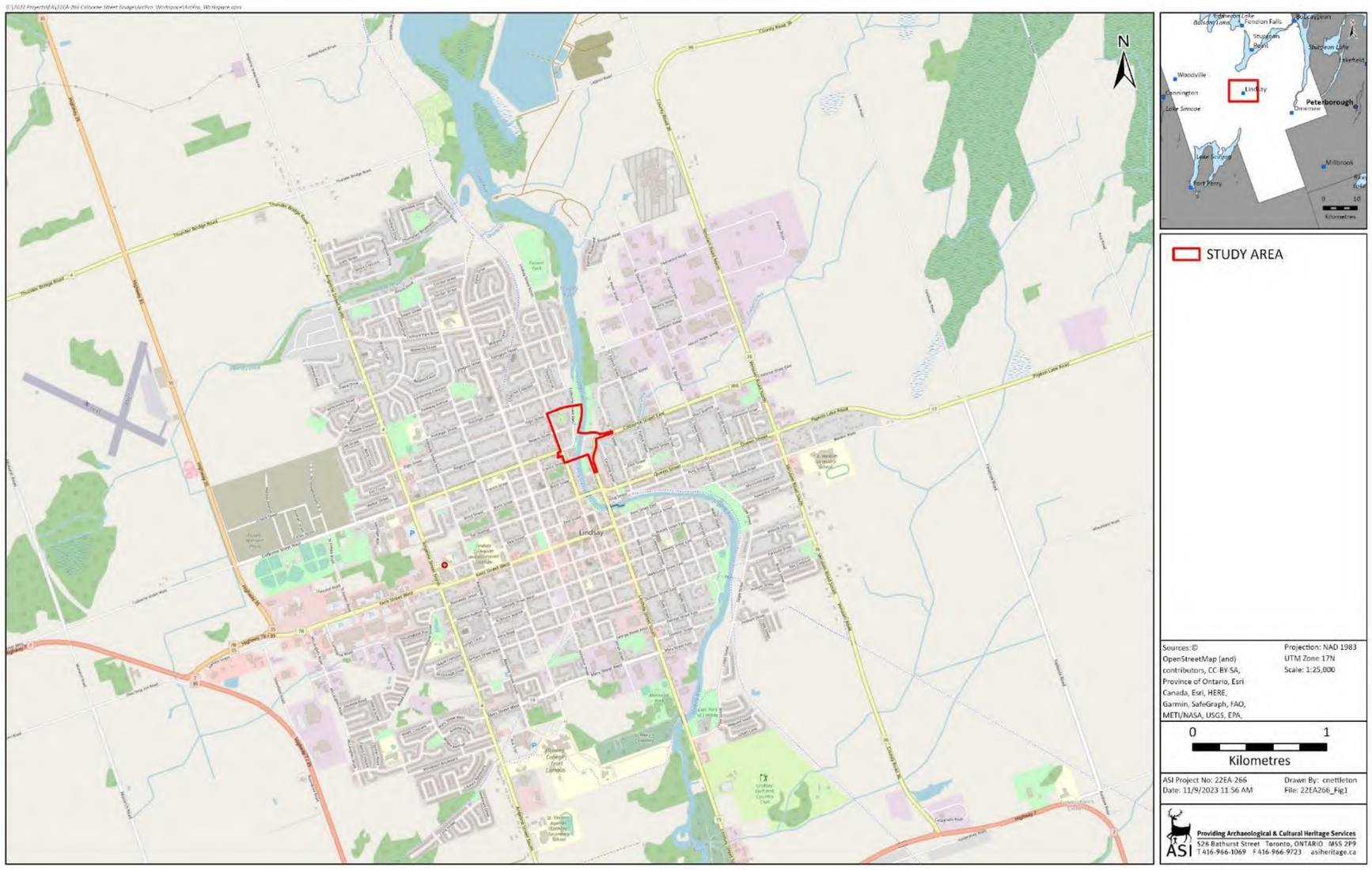


Figure 1: Colborne Street Bridge - Study Area.

Figure 2: Study Area (Approximate Location) Overlaid on the 1877 Map of the County of Victoria.

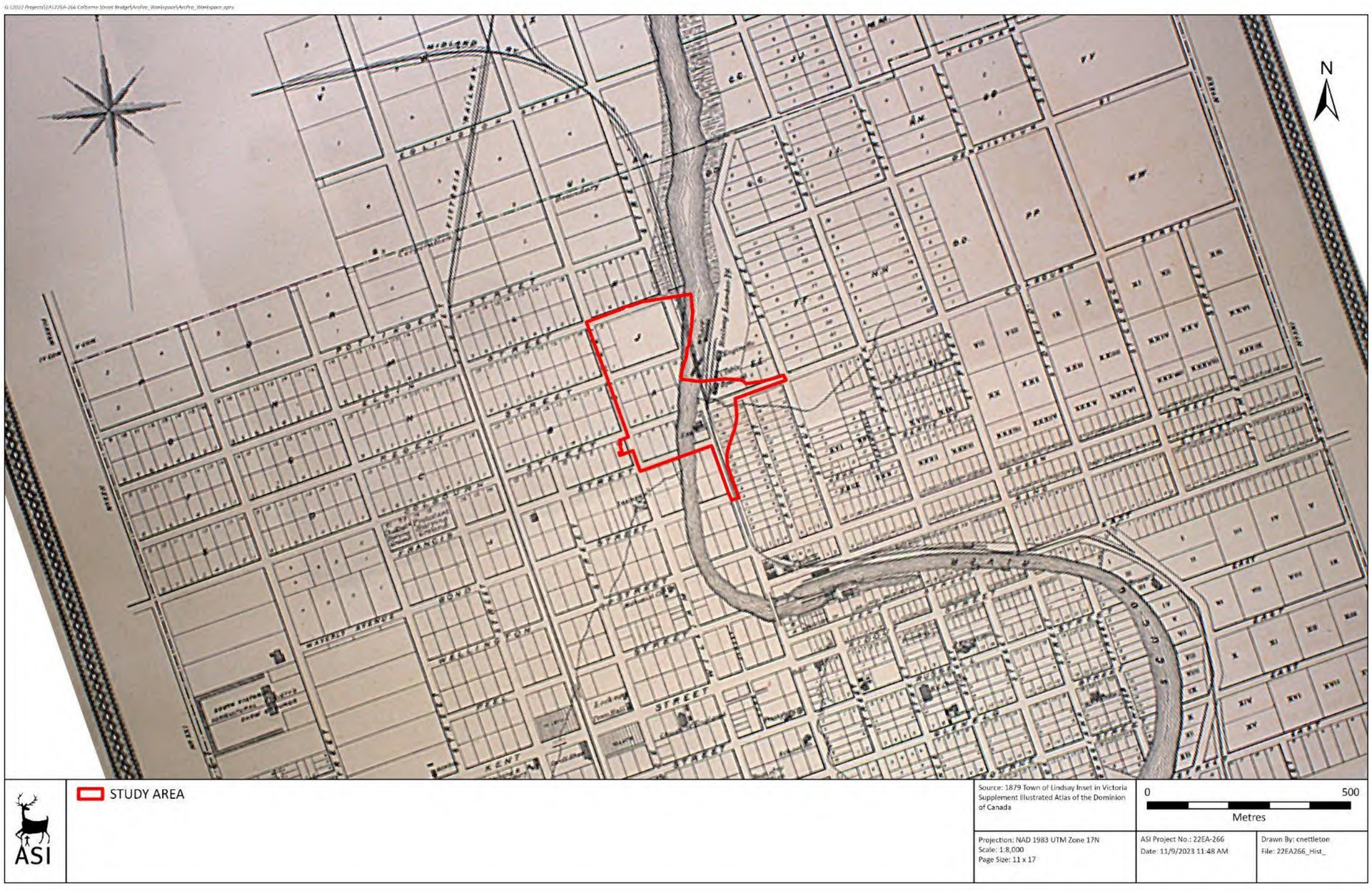


Figure 3: Study Area (Approximate Location) Overlaid on the 1879 Town of Lindsay map in the Illustrated Atlas of the Dominion of Canada.

Figure 4: Study Area (Approximate Location) Overlaid on the 1881 Victoria Supplement in the Illustrated Atlas of the Dominion of Canada.

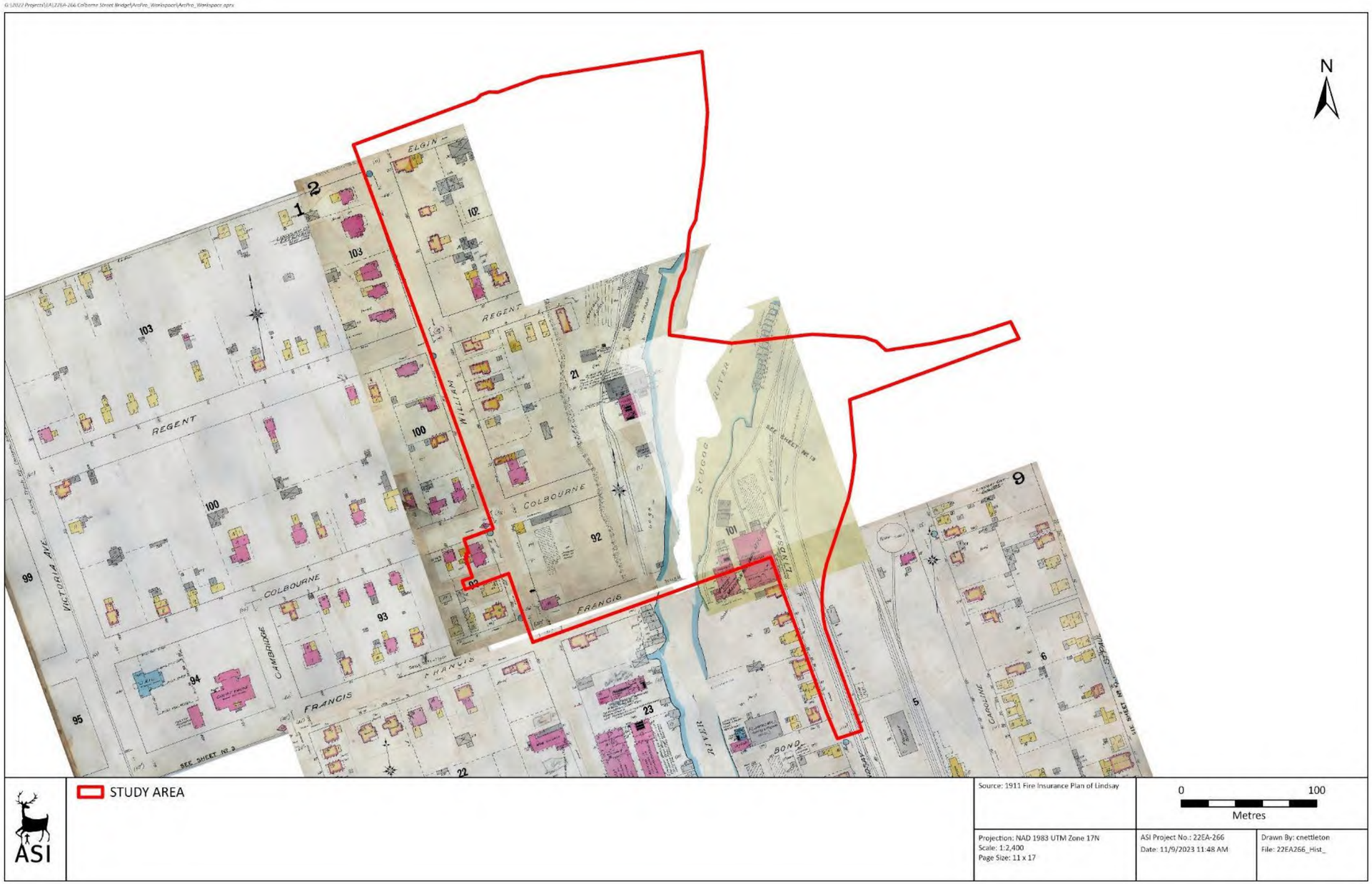


Figure 5: Study Area (Approximate Location) Overlaid on the 1911 Fire Insurance Plan of Lindsay.

Figure 6: Study Area (Approximate Location) Overlaid on the 1938 Topographic Map Lindsay Sheet.

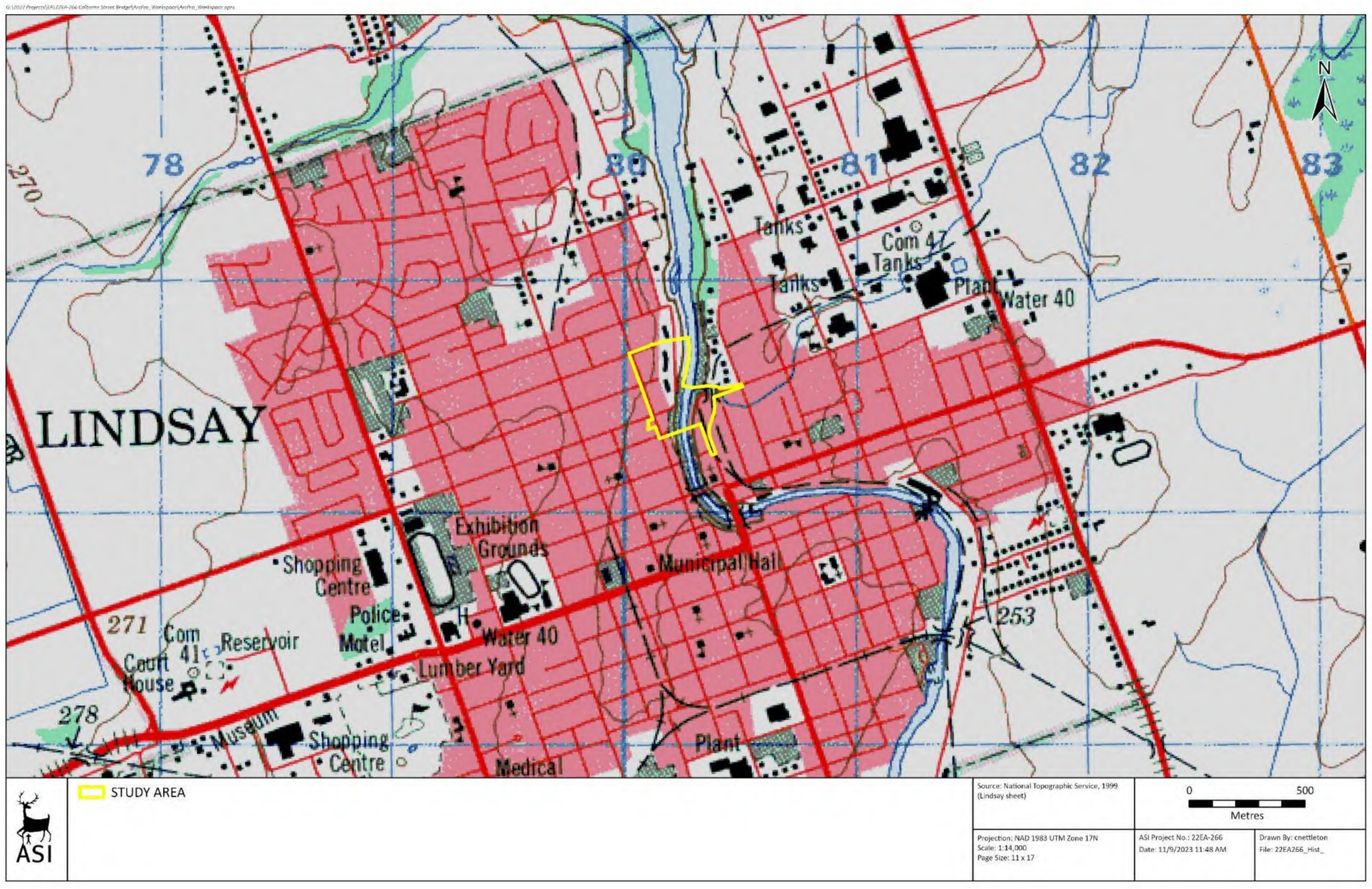


Figure 7: Study Area (Approximate Location) Overlaid on the National Topographic Series 1999 Lindsay Sheet.

Figure 8: Study Area (Approximate Location) Overlaid on the 1954 Aerial Photography.

Figure 9: Study Area – Surficial Geology.

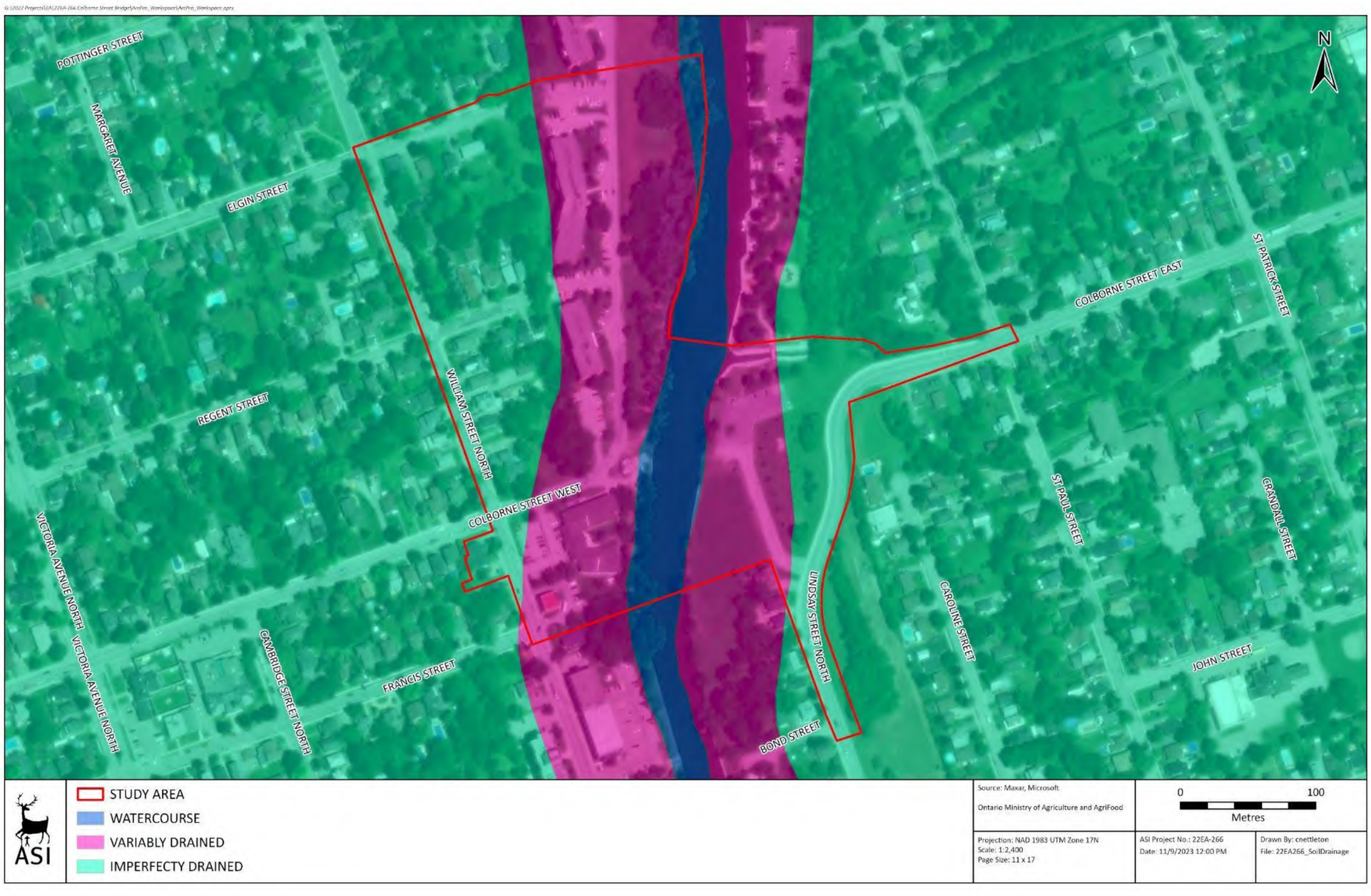


Figure 10: Study Area – Soil Drainage.

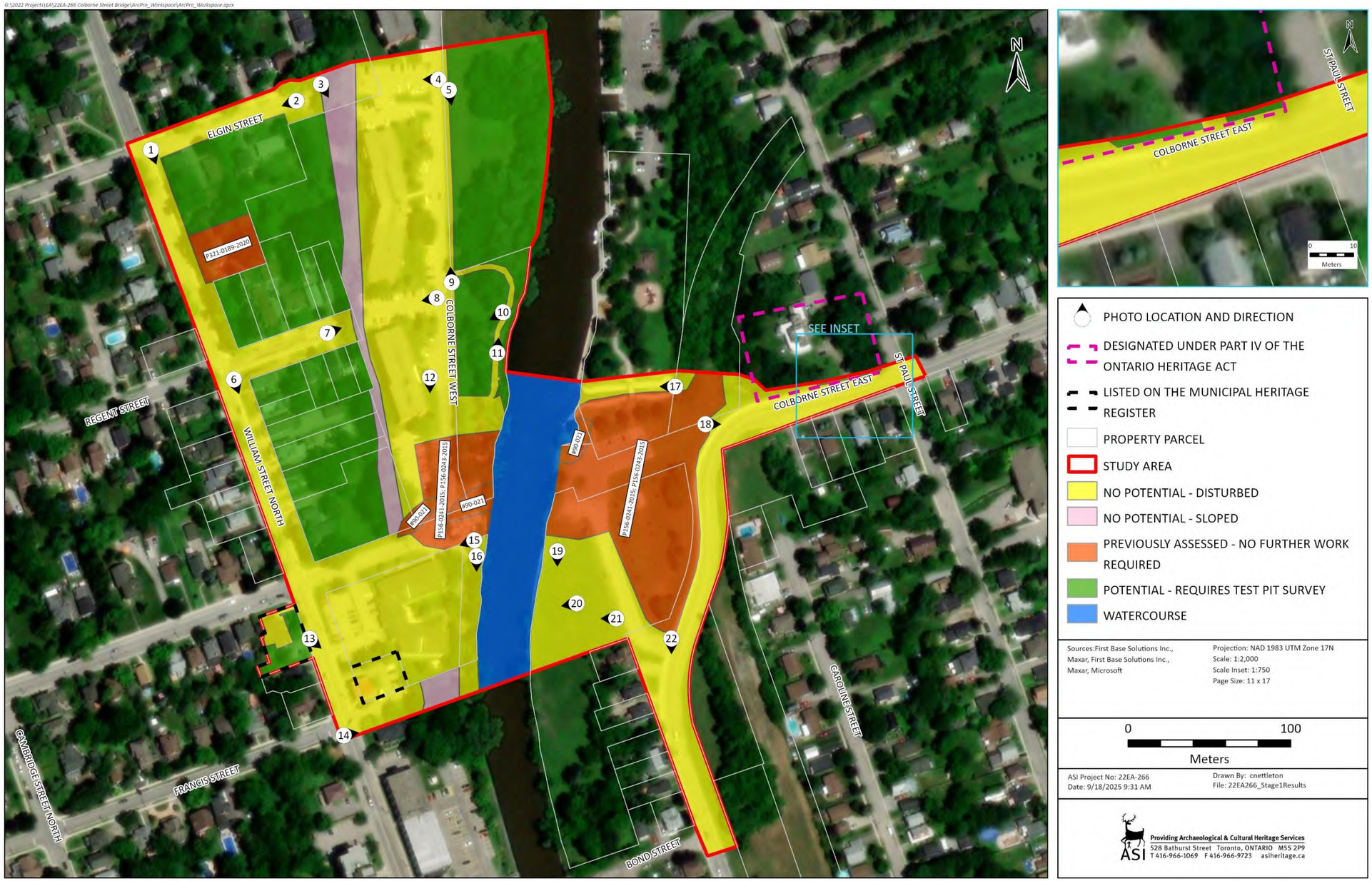


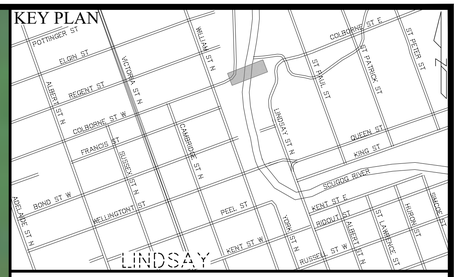
Figure 11: Colborne Street Bridge – Results of Stage 1.

Appendix A: 60% Design Plan

PLAN - TEMPORARY STAGING AREAS
1:250

PLOT SCALE: 1:1 DATE PLOTTED: 2025-11-07

KEY PLAN



CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXIST'G U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING FOR STAKE OUT. THE CKL AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

REVIEWED BY

_____ P. Eng ( ) C.E.T./C.Tech ( ) OTHER ( )

PUBLIC WORKS/ENGINEERING DEPARTMENT

DATE: _____

BENCHMARK (S)

No.	REVISION	DATE	BY	APPROVED
1	ISSUED FOR 30% REVIEW	JAN 31/24	A.K.	A.K.
2	ISSUED FOR 60% REVIEW	JUNE 02/25	A.K.	A.K.
3	ISSUED FOR 90% REVIEW	NOV 07/25	A.K.	A.K.

KAWARTHA LAKES

PUBLIC WORKS DEPARTMENT
AND
ENGINEERING SERVICES

12 PEEL STREET
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K9V 5R8

(705) 324-9411

ENGINEER'S STAMP

CONSULTANT

CIMA+
1600 - 140 FULLARTON ST, LONDON ON, N6A 5P2
CANADA

COLBORNE STREET BRIDGE OVER SCUGOG RIVER

CONSTRUCTION STAGING AREA

DESIGNED BY: A.KHAN	SCALES: AS NOTED	PROJECT No: B001592
CHECKED BY: A.KHAN		DRAWING: ST-11-2
DRAWN BY: A.NAJAR		SHEET No: OF XX
DATE: November 7, 2025	CONTRACT NO. XXXX-XX-XX	

COLBORNE STREET RECONSTRUCTION

PLAN AND PROFILE

COLBORNE STREET
from STA. 1+904.80 to STA. 2+401.11

Kawartha Lakes

INFRASTRUCTURE DESIGN AND CONSTRUCTION

ENGINEERING & CORPORATE ASSETS
322 KENT ST. W.
LINDSAY, ON K9V 5R8
(705) 324-9411

SECTION A-A

LEGEND

- EXISTING WATERMAIN
- LIMIT OF CONSTRUCTION
- PROPERTY LINE
- EXISTING STORM
- PROPOSED STORM
- PROPOSED MAINTENANCE HOLE
- PROPOSED CATCH BASIN
- EXISTING MAINTENANCE HOLE
- EXISTING CATCH BASIN
- PROPOSED CURB & GUTTER
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ASPHALT ROADWAY
- GRAVEL DRIVEWAY
- SOD
- PROPOSED TACTILE PLATES

1:250
0 5 10 20 30

CIMA+
2nd Floor - 415 Baseline Road West, Bowmanville, ON L1C 5M2
Phone: 905-697-4454
www.cima.ca

Cultural Heritage Report: Existing Conditions

Detailed Design of the Colborne Street Bridge

City of Kawartha Lakes, Ontario

Final Interim Report

Prepared for:

CIMA+
4096 Meadowbrook Drive, Unit 112
London, ON N6L 1G4

Archaeological Services Inc. File: 22CH-168

May 2023

Executive Summary

Archaeological Services Inc. was contracted by CIMA+, on behalf of the City of Kawartha Lakes, to conduct a Cultural Heritage Report as part of the Detailed Design of the Colborne Street Bridge project. The Colborne Street Bridge project involves the creation of a new bridge crossing over the Scugog River that would connect Colborne Street West and Colborne Street East in the community of Lindsay. The project study area on the east side of Scugog River consist of Rivera Park and associated greenspace, the Colborne Street Sewage Pumping Station, and low-rise residential buildings on Colborne Street East and Lindsay Street North. The project study area on the west side of the Scugog River consists of a walking trail on the bank of the river, and a residential area that features late-twentieth-century low-rise apartment buildings adjacent to the river and late nineteenth and early twentieth-century residences further west of the river.

The purpose of this report is to present an inventory of known and potential built heritage resources (B.H.R.s) and cultural heritage landscapes (C.H.L.s), identify existing conditions of the project study area, provide a preliminary impact assessment, and propose appropriate mitigation measures. This interim submission includes the Existing Conditions component of the assessment and will be updated to include the Preliminary Impact Assessment when detailed designs are available for review.

The results of background historical research and a review of secondary source material, including historical mapping, indicate a study area with an Indigenous land use dating back thousands of years, and an urban and industrial Euro Canadian land use history dating back to the mid nineteenth century. A review of federal, provincial, and municipal registers, inventories, and databases revealed that there is one known resource B.H.R within the study area. An additional three potential B.H.R.s and four potential C.H.L.s were identified during background research and field review.

Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid unintended negative impacts to identified B.H.R.s and C.H.L.s. Avoidance measures may include, but are not limited to: erecting temporary fencing, establishing buffer zones, issuing instructions to construction crews to avoid identified features, etc.

2. Once detailed designs of the proposed work are available for review, this report will be updated with a confirmation of impacts of the undertaking on the B.H.R.s and C.H.L.s identified within the study area and will recommend appropriate mitigation measures. Mitigation measures may include, but are not limited to, completing a property-specific heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.

3. Should future work require an expansion of the study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential B.H.R.s and C.H.L.s.

4. The existing conditions report should be submitted to the City of Kawartha Lakes for review and comment. Once the report is updated with the preliminary impact assessment of the preferred alternative, the report should be submitted to the City of Kawartha Lakes and the Ministry of Citizenship and Multiculturalism for review and comment, and any other local heritage stakeholders that may have an interest in this project. The final report should be submitted to the City of Kawartha Lakes for their records.

Report Accessibility Features

This report has been formatted to meet the Information and Communications Standards under the *Accessibility for Ontarians with Disabilities Act*, 2005 (A.O.D.A.). Features of this report which enhance accessibility include: headings, font size and colour, alternative text provided for images, and the use of periods within acronyms. Given this is a technical report, there may be instances where additional accommodation is required in order for readers to access the report's information. If additional accommodation is required, please contact Annie Veilleux, Manager of the Cultural Heritage Division at Archaeological Services Inc., by email at aveilleux@asiheritage.ca or by phone 416-966-1069 ext. 255.

Project Personnel

- **Senior Project Manager**: Lindsay Graves, M.A., C.A.H.P., Senior Cultural Heritage Specialist, Assistant Manager - Cultural Heritage Division
- **Project Coordinator:** Katrina Thach, B.A. (Hon), Associate Archaeologist, Project Coordinator - Environmental Assessment Division
- **Project Manager**: John Sleath, M.A., Cultural Heritage Specialist, Project Manager - Cultural Heritage Division
- **Field Review**: Lindsay Parsons, M.M.St., M.P.L., Cultural Heritage Technician, Technical Writer and Researcher – Cultural Heritage Division
- **Report Production**: Lindsay Parsons
- **Graphics Production**: Peter Bikoulis, P.h.D., Archaeologist, Geomatics Technician – Operations Division
- **Report Reviewer(s)**: Lindsay Graves and John Sleath

Qualified Persons Involved in the Project

Lindsay Graves, M.A., C.A.H.P.
Senior Cultural Heritage Specialist, Assistant Manager - Cultural Heritage Division

The Senior Project Manager for this Cultural Heritage Report is **Lindsay Graves** (M.A., Heritage Conservation), Senior Cultural Heritage Specialist and Assistant Manager for the Cultural Heritage Division. She was responsible for: overall project scoping and approach; development and confirmation of technical findings and study recommendations; application of relevant standards, guidelines and regulations; and implementation of quality control procedures. Lindsay is academically trained in the fields of heritage conservation, cultural anthropology, archaeology, and collections management and has over 15 years of experience in the field of cultural heritage resource management. This work has focused on the assessment, evaluation, and protection of built heritage resources and cultural heritage landscapes. Lindsay has extensive experience undertaking archival research, heritage survey work, heritage evaluation and heritage impact assessment. She has also contributed to cultural heritage landscape studies and heritage conservation plans, led heritage commemoration and interpretive programs, and worked collaboratively with multidisciplinary teams to sensitively plan interventions at historic sites/places. In addition, she is a leader in the completion of heritage studies required to fulfill Class Environmental Assessment processes and has served as Project Manager for over 100 heritage assessments during her time at A.S.I. Lindsay is a member of the Canadian Association of Heritage Professionals.

John Sleath, M.A.
Cultural Heritage Specialist, Project Manager - Cultural Heritage Division

The Project Manager for this Cultural Heritage Report is **John Sleath** (M.A.), who is a Cultural Heritage Specialist and Project Manager within the Cultural Heritage Division with A.S.I. He was responsible for the day-to-day management activities, including scoping of research activities and site surveys and drafting of study

findings and recommendations. John has worked in a variety of contexts within the field of cultural heritage resource management for the past 14 years, as an archaeologist and as a cultural heritage professional. An exposure to both land-based and underwater archaeology and above ground cultural heritage assessments has provided John with a holistic understanding of heritage in a variety of contexts. In 2015 John began working in the Cultural Heritage Division researching and preparing a multitude of cultural heritage assessment reports and for which he was responsible for a variety of tasks including: completing archival research, investigating built heritage and cultural heritage landscapes, report preparation, historical map regression, and municipal consultation. Since 2018 John has been a project manager responsible for a variety of tasks required for successful project completion. This work has allowed John to engage with stakeholders from the public and private sector, as well as representatives from local municipal planning departments and museums. John has conducted hundreds of cultural heritage assessments across Ontario, with a focus on transit and rail corridor infrastructure including bridges and culverts.

Lindsay Parsons, M.P.L., M.M.St.
Cultural Heritage Technician, Technical Writer and Researcher - Cultural Heritage Division

The Cultural Heritage Technician for this project is **Lindsay Parsons** (M.P.L., M.M.St.), who is a Cultural Heritage Technician and Technical Writer and Researcher within the Cultural Heritage Division. She was responsible for preparing and contributing to research and technical reporting. Lindsay's work as a cultural heritage professional has focused on historical and archival research, interpreting the built environment, and cultural heritage landscape studies. Lindsay holds a M.P.L. from Toronto Metropolitan University, where she focused her studies on understanding the values that guide heritage conservation practices and how these values influence what and whose heritage is conserved. Lindsay also graduated with an M.M.St., where she focused her studies on collections management, as well as interpretation and story-telling with a particular focus on the built environment. Lindsay's experience in and understanding of both the museum and planning worlds has given her a holistic

understanding of built heritage resources and cultural heritage landscapes, the many challenges they face in ever-evolving environments, and best practices in their conservation and interpretation.

Glossary

Built Heritage Resource (B.H.R.)
Definition: "…a building, structure, monument, installation or any manufactured remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community. built heritage resources are located on property that may be designated under Parts IV or V of the *Ontario Heritage Act*, or that may be included on local, provincial, federal and/or international registers" (Ministry of Municipal Affairs and Housing, 2020, p. 41).

Cultural Heritage Landscape (C.H.L.)
Definition: "…a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or interest under the *Ontario Heritage Act*, or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms" (Ministry of Municipal Affairs and Housing, 2020, p. 42).

Known Built Heritage Resource or Cultural Heritage Landscape
Definition: A known built heritage resource or cultural heritage landscape is a property that has recognized cultural heritage value or interest. This can include a property listed on a Municipal Heritage Register, designated under Part IV or V of the *Ontario Heritage Act*, or protected by a heritage agreement, covenant or easement, protected by the *Heritage Railway Stations Protection Act or the Heritage Lighthouse Protection Act*, identified as a Federal Heritage Building, or located within a U.N.E.S.C.O. World Heritage Site (Ministry of Tourism, Culture and Sport, 2016).

Impact
Definition: Includes negative and positive, direct and indirect effects to an identified built heritage resource and cultural heritage landscape. Direct impacts include destruction of any, or part of any, significant heritage attributes or features and/or unsympathetic or incompatible alterations to an identified resource. Indirect impacts include, but are not limited to, creation of shadows, isolation of heritage attributes, direct or indirect obstruction of significant views, change in land use, land disturbances (Ministry of Tourism Culture and Sport, 2006b). Indirect impacts also include potential vibration impacts (See Section 2.5 for complete definition and discussion of potential impacts).

Mitigation
Definition: Mitigation is the process of lessening or negating anticipated adverse impacts to built heritage resources or cultural heritage landscapes and may include, but are not limited to, such actions as avoidance, monitoring, protection, relocation, remedial landscaping, and documentation of the cultural heritage landscape and/or built heritage resource if to be demolished or relocated (Ministry of Tourism Culture and Sport, 2006a).

Potential Built Heritage Resource or Cultural Heritage Landscape
Definition: A potential built heritage resource or cultural heritage landscape is a property that has the potential for cultural heritage value or interest. This can include properties/project area that contain a parcel of land that is the subject of a commemorative or interpretive plaque, is adjacent to a known burial site and/or cemetery, is in a Canadian Heritage River Watershed, or contains buildings or structures that are 40 or more years old (Ministry of Tourism, Culture and Sport, 2016).

Significant
Definition: With regard to cultural heritage and archaeology resources, significant means “resources that have been determined to have cultural heritage value or interest. Processes and criteria for determining cultural heritage value or interest are established by the Province under the authority of the *Ontario Heritage Act.*

While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation" (Ministry of Municipal Affairs and Housing, 2020, p. 51).

Vibration Zone of Influence

Definition: Area within a 50 metre buffer of construction-related activities in which there is potential to affect an identified built heritage resource or cultural heritage landscape. A 50 metre buffer is applied in the absence of a project-specific defined vibration zone of influence based on existing secondary source literature and direction (Carman et al., 2012; Crispino & D'Apuzzo, 2001; P. Ellis, 1987; Rainer, 1982; Wiss, 1981). This buffer accommodates the additional threat from collisions with heavy machinery or subsidence (Randl, 2001).

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1.0 Introduction

Archaeological Services Inc. was contracted by CIMA+, on behalf of the City of Kawartha Lakes, to conduct a Cultural Heritage Report as part of the Detailed Design of the Colborne Street Bridge project. The purpose of this report is to present an inventory of known and potential built heritage resources (B.H.R.s) and cultural heritage landscapes (C.H.L.s), identify existing conditions of the project study area, provide a preliminary impact assessment, and propose appropriate mitigation measures. This interim submission includes the Existing Conditions component of the assessment and will be updated to include a preliminary impact assessment when detailed designs are available for review.

1.1 Project Overview

The Detailed Design of the Colborne Street Bridge project involves the creation of a new bridge crossing over the Scugog River that would connect Colborne Street West and Colborne Street East in the community of Lindsay. The project study area on the east side of Scugog River consists of Rivera Park and associated greenspace, the Colborne Street Sewage Pumping Station, and low-rise residential buildings on Colborne Street East and Lindsay Street North. The project study area on the west side of the Scugog River consists of a walking trail on the bank of the river, and a residential area that features late-twentieth century low-rise apartment buildings adjacent to the river and late nineteenth and early twentieth century residences further west of the river.

A Class Environmental Assessment and Preliminary Design study (referred to as the Environmental Study Report) for the new bridge crossing over the Scugog River was previously undertaken by the County of Victoria (now the City of Kawartha Lakes) in 1994 (Cole, Sherman and Associates, 2000). This study resulted in the Colborne Street right-of-way being selected as the preferred location for the new bridge crossing. The report further recommended a two phase strategy that included widening of the existing Wellington Street bridge, which was completed in 1995, and the construction of a Colborne Street bridge

crossing when crossing demand reached 26,800 vehicles per day. When the demand threshold was met, an amendment to the original 1994 Environmental Study Report was undertaken in 2000 to document and evaluate the anticipated environmental effects of the new bridge crossing and methods to minimize potential impacts. This report is referred to as the Addendum to the 1994 Environmental Study Report (Cole, Sherman and Associates, 2000).

Based on proposed designs for the Colborne Street Bridge in 2000, the Addendum confirmed the findings of the 1994 Environmental Study Report that no historical structures would be affected by the proposed bridge crossing on Colborne Street (Cole, Sherman and Associates, 2000). No cultural heritage resource assessment report has been completed for this project to date. Archaeological Services Inc. has been retained to complete a Cultural Heritage Report that identifies known and potential B.H.R.s and C.H.L.s potentially impacted by the undertaking and to allow for more detailed cultural heritage evaluation and detailed impact assessment work where required.

1.2 Description of Study Area

This Cultural Heritage Report will focus on the project study area with an additional 50 metre buffer (Figure 1). This project study area has been defined as inclusive of those lands that may contain B.H.R.s or C.H.L.s that may be subject to direct or indirect impacts as a result of the proposed undertaking. Properties within the study area are located in the City of Kawartha Lakes.

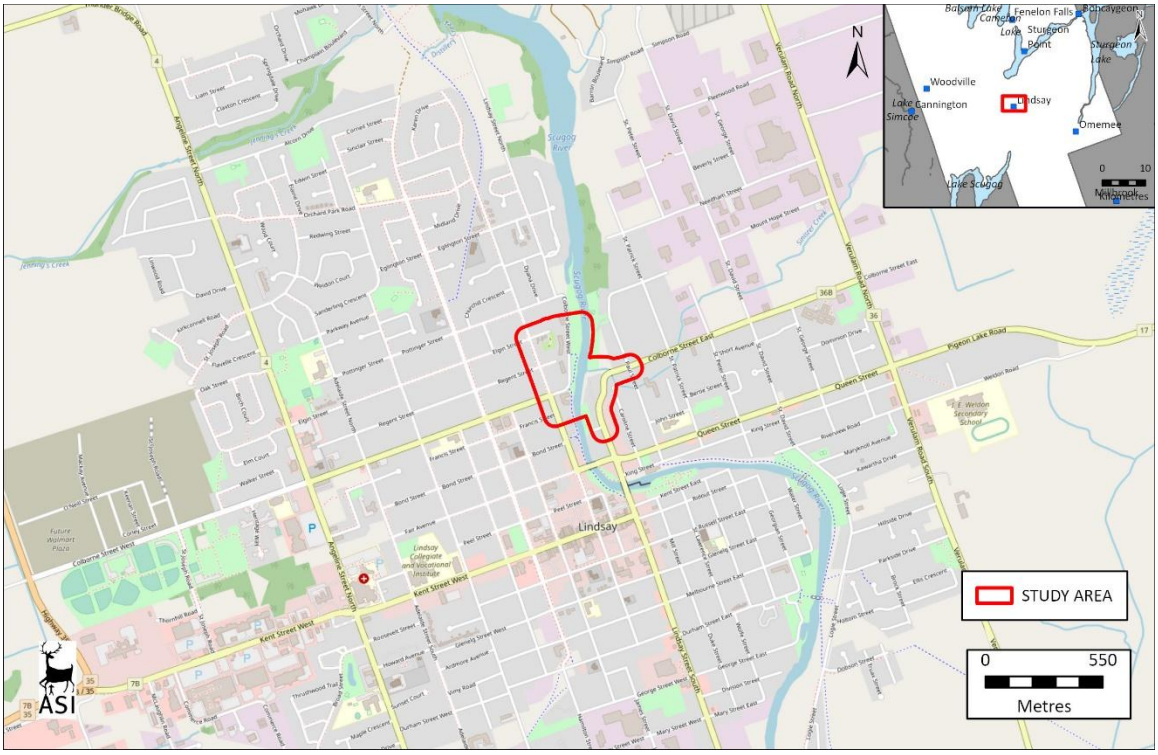


Figure 1: Location of the study area (Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (C.C.-By-S.A.))

2.0 Methodology

The following sections provide a summary of regulatory requirements and municipal and regional heritage policies that guide this cultural heritage assessment. In addition, an overview of the process undertaken to identify known and potential built heritage resources and cultural heritage landscapes is provided, along with a description of how the preliminary impact assessment will be undertaken.

2.1 Regulatory Requirements

The *Ontario Heritage Act* (O.H.A.) (Ontario Heritage Act, R.S.O. c. O.18, 1990 [as Amended in 2023], 1990) is the primary piece of legislation that determines policies, priorities and programs for the conservation of Ontario's heritage. There are many other provincial acts, regulations and policies governing land use

planning and resource development that support heritage conservation, including:

- The *Planning Act* (Planning Act, R.S.O. 1990, c. P.13, 1990), which states that "conservation of features of significant architectural, cultural, historical, archaeological or scientific interest" is a "matter of provincial interest". The *Provincial Policy Statement* (Ministry of Municipal Affairs and Housing, 2020), issued under the *Planning Act*, links heritage conservation to long-term economic prosperity and requires municipalities and the Crown to conserve significant built heritage resources and cultural heritage landscapes.

- The *Environmental Assessment Act* (Environmental Assessment Act, R.S.O. c. E.18, 1990), which defines "environment" to include cultural conditions that influence the life of humans or a community. Cultural heritage resources, which includes archaeological resources, built heritage resources and cultural heritage landscapes, are important components of those cultural conditions.

The Ministry of Citizenship and Multiculturalism (hereafter "The Ministry") is charged under Section 2.0 of the O.H.A. with the responsibility to determine policies, priorities, and programs for the conservation, protection, and preservation of the heritage of Ontario. The *Standards and Guidelines for Conservation of Provincial Heritage Properties* (Ministry of Tourism Culture and Sport, 2010) (hereinafter "*Standards and Guidelines")* apply to properties the Government of Ontario owns or controls that have "cultural heritage value or interest" (C.H.V.I.). The *Standards and Guidelines* provide a series of guidelines that apply to provincial heritage properties in the areas of identification and evaluation; protection; maintenance; use; and disposal. For the purpose of this report, the *Standards and Guidelines* provide points of reference to aid in determining potential heritage significance in identification of built heritage resources and cultural heritage landscapes. While not directly applicable for use in properties not under provincial ownership, the *Standards and Guidelines* are

regarded as best practice for guiding heritage assessments and ensure that additional identification and mitigation measures are considered.

Similarly, the *Ontario Heritage Tool Kit* (Ministry of Culture, 2006) provides a guide to evaluate heritage properties. To conserve a built heritage resource or cultural heritage landscape, the *Ontario Heritage Tool Kit* states that a municipality or approval authority may require a heritage impact assessment and/or a conservation plan to guide the approval, modification, or denial of a proposed development.

2.2 Municipal/Regional Heritage Policies

The study area is located within the community of Lindsay in the City of Kawartha Lakes. Policies relating to built heritage resources and cultural heritage landscapes were reviewed from the following sources:

- Town of Lindsay *Official Plan* (City of Kawartha Lakes, 2016)
- City of Kawartha Lakes *Official Plan* (City of Kawartha Lakes, 2016)

2.3 Identification of Built Heritage Resources and Cultural Heritage Landscapes

This Cultural Heritage Report follows guidelines presented in the *Ontario Heritage Tool Kit* (Ministry of Culture, 2006) and *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* (Ministry of Tourism, Culture and Sport, 2016). The objective of this report is to present an inventory of known and potential built heritage resources and cultural heritage landscapes, and to provide a preliminary understanding of known and potential built heritage resources and cultural heritage landscapes located within areas anticipated to be directly or indirectly impacted by the proposed project.

In the course of the cultural heritage assessment process, all potentially affected built heritage resources and cultural heritage landscapes are subject to

identification and inventory. Generally, when conducting an identification of built heritage resources and cultural heritage landscapes within a study area, three stages of research and data collection are undertaken to appropriately establish the potential for and existence of built heritage resources and cultural heritage landscapes in a geographic area: background research and desktop data collection; field review; and identification.

Background historical research, which includes consultation of primary and secondary source research and historical mapping, is undertaken to identify early settlement patterns and broad agents or themes of change in a study area. This stage in the data collection process enables the researcher to determine the presence of sensitive heritage areas that correspond to nineteenth- and twentieth-century settlement and development patterns. To augment data collected during this stage of the research process, federal, provincial, and municipal databases and/or agencies are consulted to obtain information about specific properties that have been previously identified and/or designated as having cultural heritage value. Typically, resources identified during these stages of the research process are reflective of particular architectural styles or construction methods, associated with an important person, place, or event, and contribute to the contextual facets of a particular place, neighbourhood, or intersection.

A field review is then undertaken to confirm the location and condition of previously identified built heritage resources and cultural heritage landscapes. The field review is also used to identify potential built heritage resources and cultural heritage landscapes that have not been previously identified on federal, provincial, or municipal databases or through other appropriate agency data sources.

During the cultural heritage assessment process, a property is identified as a potential built heritage resources or cultural heritage landscape based on research, the Ministry screening tool, and professional expertise and best practice. In addition, use of a 40-year-old benchmark is a guiding principle when

conducting a preliminary identification of built heritage resources and cultural heritage landscapes. While identification of a resource that is 40 years old or older does not confer outright heritage significance, this benchmark provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from having cultural heritage value or interest.

2.4 Background Information Review

To make an identification of previously identified known or potential built heritage resources and cultural heritage landscapes within the study area, the following sections present the resources that were consulted as part of this Cultural Heritage Report.

2.4.1 Review of Existing Heritage Inventories

A number of resources were consulted in order to identify previously identified built heritage resources and cultural heritage landscapes within the study area. These resources, reviewed on 20 April, 2023, include:

- The City of Kawartha Lakes' Heritage Register (City of Kawartha Lakes, 2022);
- Historical maps (including historical atlases, topographic maps, and aerial photography);
- The *Ontario Heritage Act Register* (Ontario Heritage Trust, n.d.b);
- The *Places of Worship Inventory* (Ontario Heritage Trust, n.d.c);
- The inventory of Ontario Heritage Trust easements (Ontario Heritage Trust, n.d.a);
- The Ontario Heritage Trust's *An Inventory of Provincial Plaques Across Ontario*: a PDF of Ontario Heritage Trust Plaques and their locations (Ontario Heritage Trust, 2018);

- The Ontario Heritage Trust's *An Inventory of Ontario Heritage Trust-owned properties across Ontario*: a PDF of properties owned by the Ontario Heritage Trust (Ontario Heritage Trust, 2019);
- Inventory of known cemeteries/burial sites in the Ontario Genealogical Society's online databases (Ontario Genealogical Society, n.d.);
- Canada's Historic Places website: available online, the searchable register provides information on historic places recognized for their heritage value at the local, provincial, territorial, and national levels (Parks Canada, n.d.a);
- Directory of Federal Heritage Designations: a searchable on-line database that identifies National Historic Sites, National Historic Events, National Historic People, Heritage Railway Stations, Federal Heritage Buildings, and Heritage Lighthouses (Parks Canada, n.d.b);
- Canadian Heritage River System: a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage (Canadian Heritage Rivers Board and Technical Planning Committee, n.d.); and,
- United Nations Educational, Scientific and Cultural Organization (U.N.E.S.C.O.) World Heritage Sites (U.N.E.S.C.O. World Heritage Centre, n.d.).

2.4.2 Review of Previous Heritage Reporting

Additional cultural heritage studies undertaken within parts of the study area were also reviewed. These include:

- Heritage Impact Assessment for the Colborne Street Sewage Pumping Station Project, City of Kawartha Lakes, Ontario (York North Archaeological Services Inc., 2016).

2.4.3 Community Information Gathering

The following individuals, groups, and/or organizations were contacted to gather information on known and potential built heritage resources and cultural heritage landscapes, active and inactive cemeteries, and areas of identified Indigenous interest within the study area:

- Emily Turner, Economic Development Officer – Heritage Planning, City of Kawartha Lakes (email communication 3 and 8 May 2023). Email correspondence confirmed that the following properties are within the study area and are listed of the City of Kawartha Lakes Heritage Register: 14 Elgin Street, 147-149 William Street North, 121-123 William Street North, and 130 William Street North. Additionally, City staff confirmed that 155 William Street North and 4 Colborne Street East are within the study area and are designated under Part IV of the Ontario Heritage Act.
- The Ministry (email communication 3 and 5 May 2023). Email correspondence confirmed that there are no properties designated by the Minister and no known Provincial Heritage Properties within the study area. The Ministry requested that any technical cultural heritage studies be shared with them for review.
- The Ontario Heritage Trust (email communications 3 May 2023). A response indicated was outstanding at the time of submission of this report.
- During report preparation in May 2023, A.S.I. made a request to the proponent that any engagement with Indigenous communities undertaken as part of this project include a discussion about known or potential built heritage resources or cultural heritage landscapes that are of interest to the respective communities. No feedback was received by the time of report submission.

2.5 Preliminary Impact Assessment Methodology

To assess the potential impacts of the undertaking, identified built heritage resources and cultural heritage landscapes are considered against a range of possible negative impacts, based on the *Ontario Heritage Tool Kit InfoSheet #5: Heritage Impact Assessments and Conservation Plans* (Ministry of Tourism Culture and Sport, 2006b). These include:

Direct impacts:

- Destruction of any, or part of any, significant heritage attributes or features; and
- Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance.

Indirect impacts:

- Shadows created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden;
- Isolation of a heritage attribute from its surrounding environment, context or a significant relationship;
- Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features;
- A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces; and
- Land disturbances such as a change in grade that alters soils, and drainage patterns that adversely affect an archaeological resource.

Indirect impacts from construction-related vibration have the potential to negatively affect built heritage resources and cultural heritage landscapes depending on the type of construction methods and machinery selected for the project and proximity and composition of the identified resources. Potential

vibration impacts are defined as having potential to affect an identified built heritage resources and cultural heritage landscapes where work is taking place within 50 metre of features on the property. A 50 metre buffer is applied in the absence of a project-specific defined vibration zone of influence based on existing secondary source literature and direction provided from the Ministry (Carman et al., 2012; Crispino & D'Apuzzo, 2001; P. Ellis, 1987; Rainer, 1982; Wiss, 1981). This buffer accommodates any additional or potential threat from collisions with heavy machinery or subsidence (Randl, 2001).

Several additional factors are also considered when evaluating potential impacts on identified built heritage resources and cultural heritage landscapes. These are outlined in a document set out by the Ministry of Culture and Communications (now Ministry of Citizenship and Multiculturalism) and the Ministry of the Environment entitled *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992). While this document has largely been superseded in some respects by more current policies and legislation, the guidance provided that continues to be of relevance to this specific project includes the following definitions:

- Magnitude: the amount of physical alteration or destruction which can be expected;
- Severity: the irreversibility or reversibility of an impact;
- Duration: the length of time an adverse impact persists;
- Frequency: the number of times an impact can be expected;
- Range: the spatial distribution, widespread or site specific, of an adverse impact; and
- Diversity: the number of different kinds of activities to affect a heritage resource.

The proposed undertaking should endeavor to avoid adversely affecting known and potential built heritage resources and cultural heritage landscapes and interventions should be managed in such a way that identified features are conserved. When the nature of the undertaking is such that adverse impacts are

unavoidable, it may be necessary to implement alternative approaches or mitigation strategies that alleviate the negative effects on identified built heritage resources and cultural heritage landscapes. Mitigation is the process of lessening or negating anticipated adverse impacts and may include, but are not limited to, such actions as avoidance, monitoring, protection, relocation, remedial landscaping, and documentation of the built heritage resource or cultural heritage landscape if to be demolished or relocated.

Various works associated with infrastructure improvements have the potential to affect built heritage resources and cultural heritage landscapes in a variety of ways, and as such, appropriate mitigation measures for the undertaking need to be considered.

3.0 Summary of Historical Development Within the Study Area

This section provides a brief summary of historical research. A review of available primary and secondary source material was undertaken to produce a contextual overview of the study area, including a general description of physiography, Indigenous land use, and Euro-Canadian settlement.

3.1 Physiography

The study area is situated within the Peterborough Drumlin Field physiographic region of southern Ontario (Chapman & Putnam, 1984). The Peterborough Drumlin Field extends from Simcoe County east to Hastings County and is generally characterized by rolling till plains overlying limestone bedrock. The region is approximately 4,532 square kilometres and contains over 3000 drumlins in addition to many other drumlinoid hills and surface flutings (Chapman & Putnam, 1984). The drumlins are composed of highly calcareous till but there are local differences in composition. The till plains of the regions were formed during the retreat of the Lake Ontario ice lobe of the Laurentide glacier and they indicate directionality of glacial advance and retreat. Till is produced from the advance of

continental glacial ice. Soil and rock is carried forward by the ice, mixed and milled, producing a heterogeneous soil which is characteristic of glaciations (Chapman & Putnam, 1984).

The physiography of a drumlinized area influences how the area developments as settlers contended with stoniness, steep slopes, and wet swampy hollows, such as the land which once surrounded the Scugog River (Chapman & Putnam, 1984; Turner, 2022). Like the rest of Ontario, this mixed and rugged landscape was surveyed into townships, concessions, and lots with base lines running parallel to the shores of the Great Lakes. This surveying technique was at odds with the general trend of the drumlin axes and resulted in a great number of triangular and diamond shaped fields and many areas that were too small or awkward to be successfully farmed. Although farming was still present in the area, with corn being a prominent crop, the physiography influenced settlement to form in a more urban form. 18 percent of the rural population was farming families, while 82 percent lived in rural hamlets and in scattered rural residences. The odd and uneven lots on sloping landscapes were more valuable as building lots than as agricultural land, which lead to greater urban development than seen in areas with more farming-appropriate landscapes (Chapman & Putnam, 1984).

3.2 Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years ago, or 11,000 Before the Common Era (B.C.E.) (Ferris, 2013).[1] During the Paleo period (c. 11,000 B.C.E. to 9,000 B.C.E.), groups tended to be small, nomadic, and non-stratified. The population relied on hunting, fishing, and gathering for sustenance, though their lives went far beyond subsistence strategies to include cultural practices including

[1] While many types of information can inform the precontact settlement of Ontario, such as oral traditions and histories, this summary provides information drawn from archaeological research conducted in southern Ontario over the last century.

but not limited to art and astronomy. Fluted points, beaked scrapers, and gravers are among the most important artifacts to have been found at various sites throughout southern Ontario, and particularly along the shorelines of former glacial lakes. Given the low regional population levels at this time, evidence concerning Paleo-Indian period groups is very limited (C. J. Ellis & Deller, 1990).

Moving into the Archaic period (c. 9,000 B.C.E. to 1,000 B.C.E.), many of the same roles and responsibilities continued as they had for millennia, with groups generally remaining small, nomadic, and non-hierarchical. The seasons dictated the size of groups (with a general tendency to congregate in the spring/summer and disperse in the fall/winter), as well as their various sustenance activities, including fishing, foraging, trapping, and food storage and preparation. There were extensive trade networks which involved the exchange of both raw materials and finished objects such as polished or ground stone tools, beads, and notched or stemmed projectile points. Furthermore, mortuary ceremonialism was evident, meaning that there were burial practices and traditions associated with a group member's death (C. J. Ellis et al., 2009; C. J. Ellis & Deller, 1990).

The Woodland period (c. 1,000 B.C.E. to 1650 C.E.) saw several trends and aspects of life remain consistent with previous generations. Among the more notable changes, however, was the introduction of pottery, the establishment of larger occupations and territorial settlements, incipient horticulture, more stratified societies, and more elaborate burials. Later in this period, settlement patterns, foods, and the socio-political system continued to change. A major shift to agriculture occurred in some regions, and the ability to grow vegetables and legumes such as corn, beans, and squash ensured long-term settlement occupation and less dependence upon hunting and fishing. This development contributed to population growth as well as the emergence of permanent villages and special purpose sites supporting those villages. Furthermore, the socio-political system shifted from one which was strongly kinship based to one that involved tribal differentiation as well as political alliances across and between regions (Birch & Williamson, 2013; Dodd et al., 1990; C. J. Ellis & Deller, 1990; Williamson, 1990).

The arrival of European trade goods in the sixteenth century, Europeans themselves in the seventeenth century, and increasing settlement efforts in the eighteenth century all significantly impacted traditional ways of life in Southern Ontario. Over time, war and disease contributed to death, dispersion, and displacement of many Indigenous peoples across the region. The Euro-Canadian population grew in both numbers and power through the eighteenth and nineteenth centuries and treaties between colonial administrators and First Nations representatives began to be negotiated.

The subject area is within Treaty 20 the Rice Lake Purchase of 1818, and the Williams Treaties of 1923, on the traditional territory of the Michi Saagiig and Chippewa Nations, collectively known as the Williams Treaties First Nations, including the Mississaugas of Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Scugog Island First Nation and the Chippewas of Beausoleil First Nation, Georgina Island First Nation and the Rama First Nation (Williams Treaties First Nations, 2017). In October and November of 1923, the governments of Canada and Ontario, chaired by A.S. Williams, signed treaties with the Chippewa and Mississauga for three large tracts of land in central Ontario and the northern shore of Lake Ontario which had never been included in previous treaties (Crown-Indigenous Relations and Northern Affairs, 2013).Part of the Williams Treaties area includes lands originally negotiated under the Rice Lake Treaty, Treaty No. 20, signed on November 5, 1818 between the Mississaugas in the Rice Lake area and the Crown, which opened up colonization for settlers (Crown-Indigenous Relations and Northern Affairs, 2016).

In 2018 the Government of Canada reached a settlement with the Williams Treaties First Nations reaffirming the recognized Treaty harvesting rights in the Williams Treaties territories of each of the seven nations.

3.3 Historical Euro-Canadian Township Survey and Settlement

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed Indigenous pathways and set up trading posts at strategic locations along the well-traveled river routes. All of these occupations occurred at sites that afforded both natural landfalls and convenient access, by means of the various waterways and overland trails, into the hinterlands. Early transportation routes followed existing Indigenous trails that typically followed the highlands adjacent to various creeks and rivers (Archaeological Services Inc., 2006). Early European settlements occupied similar locations as Indigenous settlements as they were generally accessible by trail or water routes and would have been in locations with good soil and suitable topography to ensure adequate drainage.

Historically, the study area was located on Lot 21 and 22, Concession 5 and Lot 21 and 22, Concession 6 in the Township of Ops, County of Victoria. It is now located in the City of Kawartha Lakes.

3.3.1 Victoria County

Settlement in Victoria County began in 1821. The first wave of settlement brought 630 immigrants. The northern townships, including Dalton, remained unoccupied for years. The County was named after Queen Victoria in 1851. Once settlement expanded into the northern township the lumbering industry resulted in the removal of most of the vast pine forests. The primeval forests that covered northern Victoria County were stripped, resulting in soil unfit for farming. Reforestation was not undertaken until the 1920s (Mika & Mika, 1983; Rayburn, 1997). The chain of lakes that drain the region were named “Kawartha”, in 1895, from the Indigenous word which means “bright waters and happy land” (Mika & Mika, 1983, p. 580). The Kawartha Lakes have drawn recreational visitors since the nineteenth century. Both Susanna Moodie and Catherine Parr Traill described picnicking among the County’s lakes and rivers (The Canadian Encyclopedia,

2015). Today the area is a popular camping and cottage destination with the historical Trent-Severn Waterway running through the area. In 2001 the townships of former Victoria County amalgamated, creating the City of Kawartha Lakes, named so after the lakes of the region (*Municipal Restructuring Activity Summary Table*, 2018; The Canadian Encyclopedia, 2015). Main population centers in the City of Kawartha Lakes include Lindsay, Bobcaygeon, Fenelon Falls, and Omemee.

3.3.2 Town of Lindsay

The community of Lindsay is in the centre of Ops Township on the Scugog River between Lake Scugog and Sturgeon Lake. It was originally a portage place called *Onigahning,* Ojibwa for 'the portage' (Scott, 1997:122). After settlement was opened for the Township of Ops in 1825, the first Euro-Canadian settlers, William Purdy and his sons, Jesse and Hazard, arrived from the United States (Mika and Mika, 1981:541). They built a dam on the Scugog River two years later, followed by a sawmill and a grist mill in 1830. A community developed around the complex, known as Purdy's Mills, which included a log house and tavern built by Jeremiah Britton and his two sons, Charles and Wellington, stores kept by Thomas Snowden and Major Thomas Murphy, and a carding mill operated by Mr. Fulford.

In 1834, John Houston (or Huston) surveyed the settlement, plotting out streets and lots for a town. It is believed that during the survey, a John Lindsay was shot in the leg and subsequently died of infection and was buried beside the river (Rayburn, 1997:193). Although there is no record of this event in Houston's diaries and no one by that name was employed by him, it is possible that the story refers to John Lindsay (or one of his sons), who was a local innkeeper at the time. Houston entered Lindsay's name and date of death on his surveyor's plan, and the name was officially accepted for the town. In 1837, William and Jessie Purdy left Purdy's Mills. The following year, the Purdy dam caused a flood in the surrounding region, which inundated some 60,000 acres. At the behest of the angry local farmers, Hazard Purdy lowered the dam and plans were made to build a lock. This opened up the possibility of navigation of the river by boat. The year

the lock was completed, 1844, Hazard sold the mills to Hiram Bigelow and moved to Grey County (Mika and Mika, 1981:542). By the mid-nineteenth century, the population of Lindsay had risen to 300 and several stores, a tannery, a potashery and iron foundry had been established. When the railway connected the town in 1857, the population burgeoned to 1,100 and the town limits were expanded. By the 1860s, high school education was offered at one of the two local public schools, and the town had a new Town Hall, a courthouse and jail, and an Opera House (Mika and Mika, 1981:543). The late nineteenth century, gas streetlamps were installed, as well as electricity. The first hospital was constructed in 1901, funded by James Ross, a millionaire from Montreal whose parents had lived in Lindsay, and in 1904, the first cinema was opened (Mika and Mika, 1981:542-3).

In 2001, Lindsay and other nearby communities were merged into the City of Kawartha Lakes (Tikkanen, 2016). In 2016, the population of Lindsay was 20,713 (Statistics Canada, 2016), and it remains a lumbering and farming centre, and a summer tourist destination and entry point to the Kawartha Lakes.

3.3.3 Midland Railway

In 1846 the Peterborough and Port Hope Railway Company was planned to run from Port Hope to Peterborough around Rice Lake. Initially growth of the rail line was slow due to financial issues and a new charter was issued in 1854 for the Port Hope, Lindsay, and Beaverton Railway Company. Four years later the company constructed a branch line from Millbrook to Peterborough, which ran through Lindsay. The railway opened up the Lindsay community to commerce opportunities to the south and the expansion of railways throughout the next several decades increased Lindsay's prominence as a transportation centre. The Midland Railway ran in a general north-south direction through the study area running along the western bank of Scugog River before crossing the river and continuing south along the eastern bank (Andreae, 1997; Toronto Railway Historical Association, 2020).

The Port Hope, Lindsay, and Beaverton Railway Company changed its name to the Midland Railway of Canada in 1869 when it planned for expansion to Beaverton and beyond. The Victoria Railway which travelled north through Fenelon Falls to Haliburton opened in 1875 and the Whitby, Port Perry and Lindsay Railway arrived in 1877. By the 1880s, the majority of regional lines had consolidated with the Midland Railway which made Lindsay its operational headquarters in 1887 (Turner, 2022). By the turn of the century, seven railway lines radiated out from Lindsay and it became an important hub for transit and shipping, moving large amounts of agricultural products and lumber from Victoria County to urban areas (Turner, 2022).

The abandonment of the original mainline between Omemee and Millbrook Junction occurred in 1882 when the company decided to build a direct line between Peterborough and Omemee. The company was later taken over by the Grand Trunk Railroad in 1893 and subsequently the Canadian National Railway in 1923 (Andreae, 1997; Toronto Railway Historical Association, 2020). Portions of the rail corridor began to be abandoned as early as 1928, with the majority being abandoned and the tracks removed after 1960. Most of this line is now preserved as part of the trail network in Ontario.

3.3.4 Scugog River

The Scugog River flows north from its headwaters at Lake Scugog to Sturgeon Lake with a total length of 85 kilometres. The watershed area is 47 square kilometers in size and passes through largely agricultural and forested areas in the south and the community of Lindsay and wetlands in the north. The watershed is managed by the Kawartha Conservation, a non-profit conservation organization established in 1979 (Kawartha Conservation, 2022).

Archaeological sites to the south of the study area indicate an historical Indigenous presence in the area and the Mississaugas of Scugog Island First Nation have confirmed the historic use of the Scugog River as a travel corridor (Turner, 2022). The Scugog River was also integral in the development of the

settlement of Lindsay, with the development of a mill and dam along the Scugog River in 1830 spurring Euro-Canadian settlement of the area. The mill and dam also impacted the surrounding landscape as it raised the water of the Scugog River by nearly seven feet in some areas. In effect, this created Lake Scugog and made the river more navigable. The importance of the Scugog River is recognized by an Ontario Heritage Trust Plaque located at Riverside Cemetery, Lindsay Street (Kawartha Conservation, 2022; Ontario Heritage Trust, 2018; Turner, 2022)

3.4 Review of Historical Mapping

The 1879 Town of Lindsay map and the 1881 Victoria Supplement map both included in *Illustrated Atlas of the Dominion of Canada* (Belden, 1881) were examined to determine the presence of historical features within the study area during the nineteenth century (Figure 2 and Figure 3). Historically, the study area is located on Lots 22 and 21, Concession 5 and Lots 22 and 21, Concession 6 in the former Township of Ops, County of Victoria.

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases. For instance, they were often financed by subscription limiting the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases. The use of historical map sources to reconstruct or predict the location of former features within the modern landscape generally begins by using common reference points between the various sources. The historical maps are geo-referenced to provide the most accurate determination of the location of any property on a modern map. The results of this exercise can often be imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including differences of scale and resolution, and distortions introduced by reproduction of the sources.

Both the 1879 Town of Lindsay map (Figure 2) and 1881 Illustrated Atlas map (Figure 3) depict the subject area located in the community of Lindsay. The 1879 map illustrates the subdivision of land within and around the subject area with lot

patterns already established on the east and west side of the Scugog River. William Street North, Elgin Street, Regent Street, Colborne Street West/East, Francis Street, and Lindsay Street North are shown to have been historically surveyed roads. Larger lot patterns exist on the west side of the river within the study area. The Midland Railway is illustrated in the 1879 map running in a general northwest-southeast direction to the east of the Scugog River. The Midland Railway crosses the river on the outskirts of the study area and runs through the northeast portion of the study area on the west side of the river. Near the railway river crossing is a Railway Lumber yard in the extant location of Rivera Park with several railway related structures and a wharf. Victoria Railway runs to the west of the study area. A schoolhouse is located on the east side of the river on Lindsay Street in the southern portion of the study area.

In addition to nineteenth-century mapping, historical topographic mapping and aerial photographs from the twentieth century were examined. This report presents maps and aerial photographs from 1938, 1954, and 1999 (Figure 4 to Figure 6).

The 1938 topographic map (Figure 4) depicts William Street North, Regent Street, Elgin Street, and Colborne Street, and Lindsay Street North as being developed with buildings lining the streets. The Canadian Pacific Railway (formerly the Midland Railway) continues to run on the east side of the Scugog River but the track now appears to continue north and east on the east side of the river rather than crossing it. The railway tracks continue to run on the west side of the river but appears to stop just south of the study area. Brown lines on the west side of the river indicate elevation changes. No roads and few structures are located on the bank of the west side of the river. Downtown Lindsay is shown developing to the south of the study area on the west side of the river. The 1954 aerial photograph (Figure 5) depicts the study area in a similar context as earlier mapping. Little development has occurred on the west bank of the Scugog River. The Canadian Pacific Railway appears to only run on the east side of the river and curves to the northeast north of the study area. The 1999 topographic map (Figure 6) depicts three large structures on the west side of the Scugog River and

to the east of the historical residential area depicted in earlier mapping. A road now runs along the west side of the river connecting Colborne Street West and Pottinger Street. The east side of the river now features Rivera Park with a portion falling within the study area. The railway line continues to be depicted on the east side of the Scugog River.

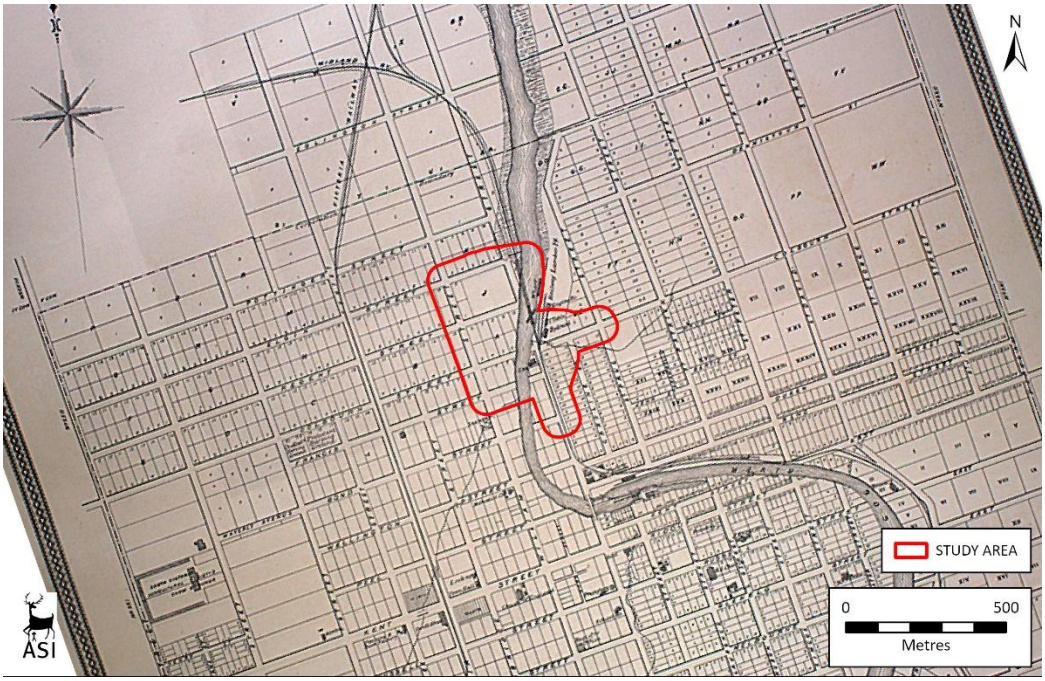


Figure 2: The location of the subject area overlaid on the 1879 Town of Lindsay map in the *Illustrated Atlas of the Dominion of Canada.* Source: (Belden, 1881)

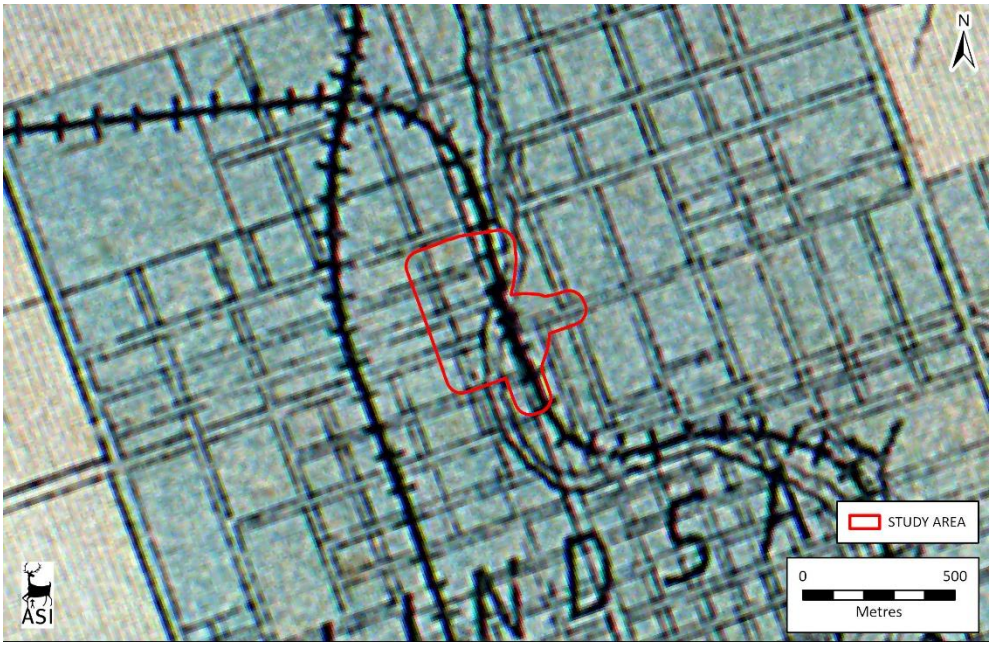


Figure 3: The location of the subject area overlaid on the 1881 Victoria Supplement in the *Illustrated Atlas of the Dominion of Canada.* Source: (Belden, 1881).

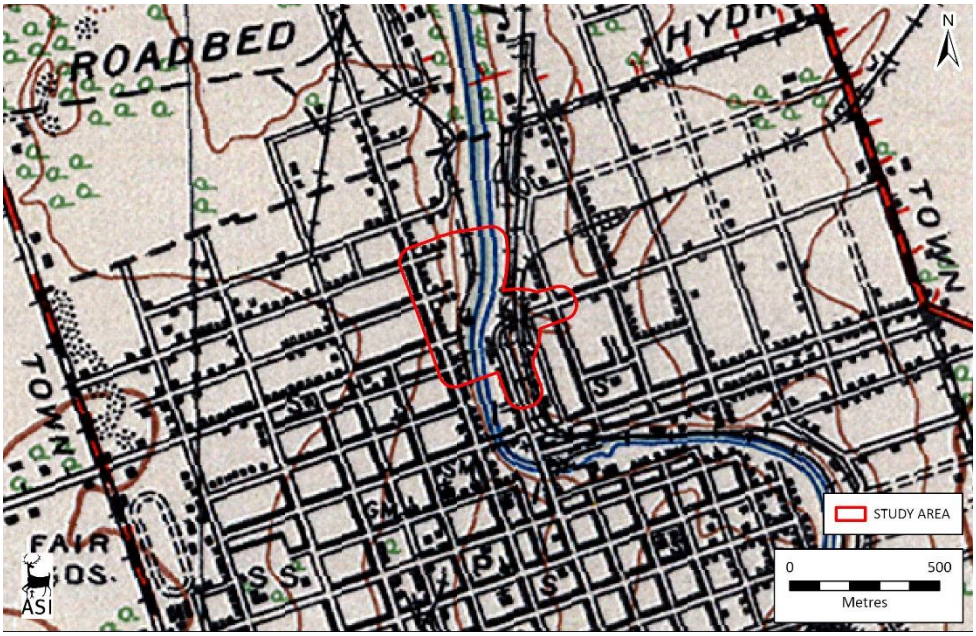


Figure 4: The location of the subject area overlaid on the 1938 topographical map of Lindsay. (Base Map: Department of National Defence 1938).

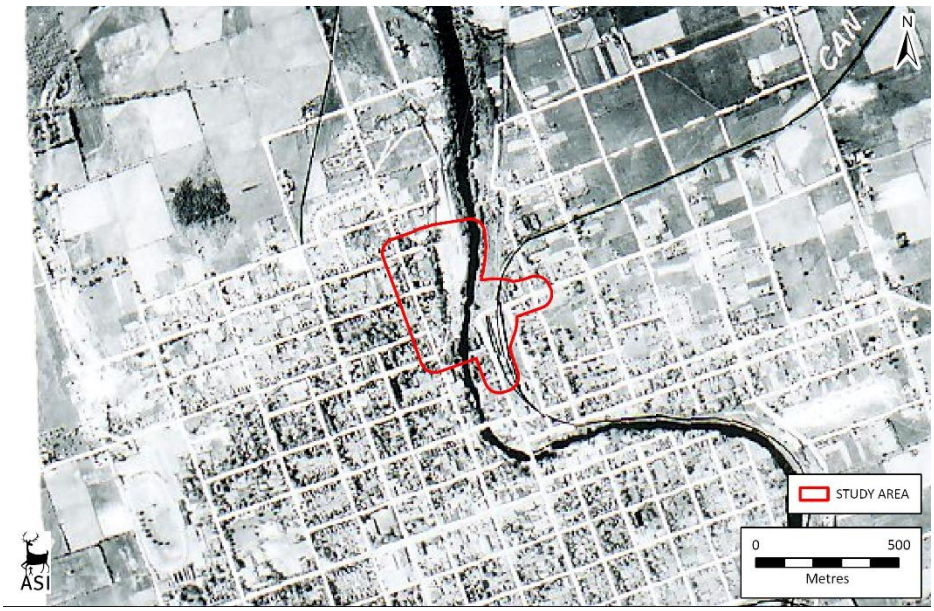


Figure 5: The location of the subject area overlaid on the 1954 aerial photograph of Southern Ontario. Source: (University of Toronto Map and Data Library & Hunting Survey Corporation Limited, 1954)

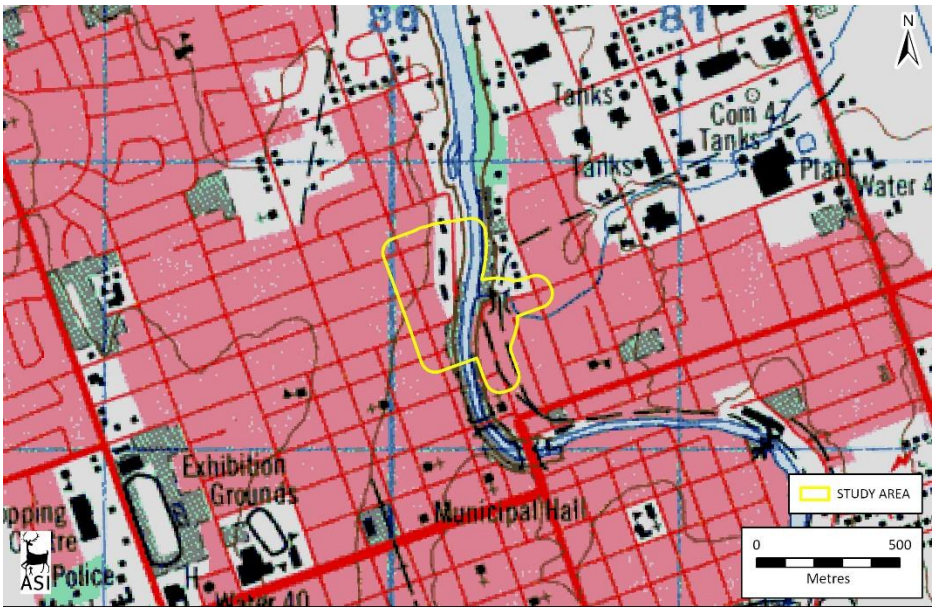


Figure 6: The location of the subject area overlaid on the 1999 topographical map of Lindsay. Source: (Natural Resources Canada, 1999).

4.0 Existing Conditions

A field review of the study area was undertaken by Lindsay Parsons of Archaeological Services Inc., on 27 April 2023 to document the existing conditions of the study area from existing rights-of-way. The existing conditions of the study area are described below and captured in Plate 1 to Plate 10.

4.1 Description of Field Review

The study area is in the community of Lindsay and focuses on portions of William Street North, Regent Street, Elgin Street, Francis Street, Colborne Street West, Colborne Street East, Lindsay Street North, and St. Paul Street. The Scugog River flows through the study area and creates a west study area and an east study area.

The west study area is primarily residential. William Street North is oriented in a general north-south alignment and carries one-lane of north-bound and one-lane of south-bound traffic (Plate 1). Elgin Street, Regent Street, Colborne Street West, and Francis Street intersect with William Street North, are oriented in a general east-west alignment, and carry one north-bound and one-south bound lane of traffic. Other than Colborne Street West east of William Street North, the streets feature paved sidewalks on one or either side of the roadway. The properties along these residential streets feature grass lawns and several mature trees line the streets. Elgin Street and Regent Street east of William Street North are dead-end streets lined with residential properties and feature a barrier at the end of the street where the elevation steeply drops to Colborne Street West and the Scugog River below (Plate 2). William Street North south of Colborne Street West features a mix of historical residences, contemporary and historical commercial buildings, and low-rise apartment buildings (Plate 3).

Colborne Street West east of William Street North has a steep drop in elevation down to the Scugog River (Plate 4). The south side of the street features a late twentieth century retirement residence building with a large, paved parking lot,

while the north side features a late-nineteenth century residence. Down the hill (to the east), Colborne Street West gradually curves to a north-south alignment to follow the alignment of the Scugog River. There are three mid-to-late twentieth century low-rise apartment buildings on the west side of Colborne Street. On the east side of Colborne Street West, there is a paved trail that runs along the river, green space, trees, and benches (Plate 5).

The east side of the study area features Rivera Park as well as a residential area (Plate 6). The park features greenspace, paved trails, a washroom, playground, boat launch area, parking lot, and the one-storey Colborne Street sewage pumping station. To the south of Rivera Park along the west side Lindsay Street North and Bond Street are residential properties (Plate 7). The residential properties range from one to one-and-a-half storeys and have narrow setbacks from the roadway. On the east side of Lindsay Street North is an undeveloped property overgrown with vegetation, as well as a City of Kawartha Lakes' two-storey institutional building.

To the north and east of Rivera Park, Lindsay Street North beings to curve to a general east-west alignment and has an elevation increase (Plate 8). As Lindsay Street North curves to the east, it crosses over a tributary from the Scugog River that runs in a general northwest-southeast alignment under the roadway. Once the roadway curves, paved sidewalks are featured on either side of the roadway. On the north side of Lindsay Street North sits a large late-nineteenth century residence with a large property. On the south side of the street is a row of one-to-one-and-a-half storey residences accessed by paved driveways from Lindsay Street North. When Lindsay Street North crosses St. Paul Street it becomes Colborne Street East. Around the intersection of Colborne Street East and St. Paul Street are one-to-one-and-a-half storey residences (Plate 9). St. Paul Street south of Colborne Street East features a slight dip in elevation due to the Scugog River tributary and associated greenspace.

The north portion of Caroline Street is also within the study area. Caroline Street is a dead-end Street that is accessed from Queen Street and is oriented in a north-

south alignment (Plate 10). It is a residential street with mature trees and a range of residences.

Plate 1: William Street looking north from Regent Street (A.S.I., 2023).

Plate 2: Elgin Street looking east towards the drop in elevation (A.S.I., 2023).

Plate 3: William Street North looking south from Colborne Street West (A.S.I., 2023).

Plate 4: Colborne Street West looking west towards William Street North. Note the change in elevation towards William Street North (A.S.I., 2023).

Plate 5: Paved trails and greenspace that runs between the Scugog River and Colborne Street West, looking north (A.S.I., 2023).

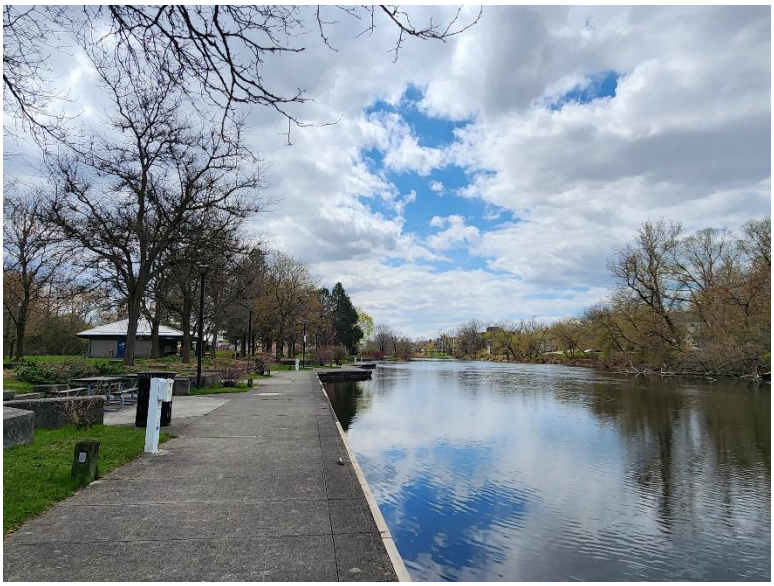


Plate 6: Rivera Park on the east side of the Scugog River, looking south (A.S.I., 2023).

Plate 7: Lindsay Street North, looking south from the entrance of Rivera Park (A.S.I., 2023).

Plate 8: Lindsay Street North curving east towards St. Paul Street (A.S.I., 2023).

Plate 9: Colborne Street East looking west towards St. Paul Street and the Scugog River (A.S.I., 2023).

Plate 10: Caroline Street, looking north (A.S.I., 2023).

4.2 Identification of Known and Potential Built Heritage Resources and Cultural Heritage Landscapes

Based on the results of the background research and field review, one known B.H.R., three potential B.H.R.s, and four potential C.H.L.s were identified within the study area. A detailed inventory of known and potential B.H.R.s and C.H.L.s within the study area is presented below in Table 1, with mapping showing their location in Figure 7 .

Table 1: Inventory of Known and Potential Built Heritage Resources and Cultural Heritage Landscapes within the Study Area

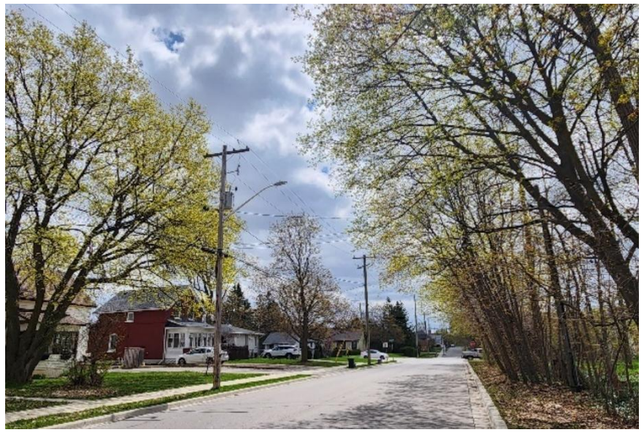
Feature I.D.	Type of Property	Address or Location	Heritage Status and Recognition	Description of Property and Known or Potential C.H.V.I.	Photographs/ Digital Image
B.H.R. 1	Residential	4 Colborne Street East	Known B.H.R. – Designated under Part IV of the Ontario Heritage Act (By-law 2018-156)	This property is located on the north side of Lindsay Street North. The two-and-a-half storey Queen Anne style residence is clad in buffed brick and was constructed in 1890 by Irene and Freemont Crandle (City of Kawartha Lakes, 2018). The house features a unique asymmetrical footprint with a bell tower and large covered verandah that wraps around the front and west elevation of the residence. The residence features a mansard roof with a front gable. The property sits atop a hill and overlooks the Scugog River. The large property features a thick tree line on the north and eastern edge of the property. Known heritage attributes of the property include unique asymmetrical design, Queen Anne style turret and the Second Empire mansard roofline, the verandah, original brick chimneys, stones situated in the ground in front of the property that read 'Riverview – Freemont Crandle', the wood paneled front door and original doorbell, and chamfered detailing brickwork over the windows (City of Kawartha Lakes, 2018). The 1938 topographic map (Figure 4) depicts the extant residence.	 Plate 11: Residence at 4 Colborne Street East (A.S.I., 2023).
B.H.R.2	Residential	46 Caroline Street	Potential B.H.R. – Identified during field review/desktop research	This property is located on the east side of Caroline Street near where the roadway ends. The one-and-a-half storey house is clad in wood and vinyl siding with a faux stone veneer along the lower portion of the front façade. The property features a front-facing gable roof. A taller one-and-a-half storey addition appears to have been added to the rear elevation of the house, with a one-storey garage on the addition's north elevation. Potential heritage attributes of the house include its height and massing, and gable roof. The 1938 topographic map (Figure 4) does not depict a residence in the location of the extant house. However, a number of residences on Caroline Street were likely constructed by the early twentieth century based on their architectural style and these properties are also not depicted on the 1938 topographic map. As such, the subject property's absence from the 1938 map may not be an accurate indication	 Plate 12: Residence at 46 Caroline Street (Google Streetview, 2020).

Feature I.D.	Type of Property	Address or Location	Heritage Status and Recognition	Description of Property and Known or Potential C.H.V.I.	Photographs/ Digital Image
				of development on Caroline Street at that time. The house does appear in the 1954 aerial photograph (Figure 5). Based on historical mapping and the vernacular architecture, the property was likely built in the early-to-mid-twentieth century.	
B.H.R. 3	Residential	44 Caroline Street	Potential B.H.R. – Identified during field review/desktop research	This property is located on the east side of Caroline Street. The one-and-a-half storey residence is clad in wood siding and features a front-facing gable roof. The residence features a one-storey sunroom on the front façade, which was likely an early addition to the residence. A one-storey rear addition has been added and the side entrance has been enclosed. Potential heritage attributes of the house include its height and massing, and gable roof. The 1938 topographic map (Figure 4) does not depict a residence in the location of the extant house. However, a number of residences on Caroline Street were likely constructed by the early nineteenth century based on their architectural style and these properties are also not depicted on the 1938 topographic map. As such, the subject property's absence from the 1938 map may not be an accurate indication of development on Caroline Street at that time. The house does appear in the 1954 aerial photograph (Figure 5). Based on historical mapping and the vernacular architecture, the property was likely built in the early-to- mid-twentieth century.	 Plate 13: Residence at 44 Caroline Street (Google Streetview, 2020).

Feature I.D.	Type of Property	Address or Location	Heritage Status and Recognition	Description of Property and Known or Potential C.H.V.I.	Photographs/ Digital Image
B.H.R. 4	Residential	41 Caroline Street	Potential B.H.R. – Identified during field review/desktop research	This property is located on the west side of Caroline Steet. This two-storey residence is clad in buffed brick and features a slight 'L' shaped footprint. The property is a vernacular style with Edwardian Classical influences as seen in the hipped roof with wide eaves, the front-side porch supported by columns (which have likely been replaced), and the simplistic footprint. The windows feature flat, rectangular openings that are accentuated with flat brick arches and plain sills. The front entrance to the residence is located on the south elevation under the porch. Potential heritage attributes include its height and massing, buffed brick, side entrance, and unique window positioning on the front façade. The property is likely depicted in the 1938 topographic map (Figure 4), although is seen slightly outside of the study area boundary. Based on historical mapping and the architectural style, the residence was likely constructed in the early nineteenth century.	 Plate 14: Residence at 41 Caroline Street (A.S.I., 2023).
C.H.L. 1	Historical Neighbourhood	William Street North Residential Neighbourhood	Potential C.H.L. – Identified during field review/desktop research	This potential C.H.L. is located in the west portion of the study area and is anchored by William Street North but includes portions of Elgin Street, Regent Street, Colborne Street West, and Francis Street. This area contains a historical residential neighbourhood that expands beyond the boundary of the study area. The streets are generally lined with residential properties from the late nineteenth and early twentieth century that feature a rich variety of architectural styles, including Queen Anne, Italianate, Foursquare, and vernacular styles. The range of architectural styles give important insight into the evolution of the residential neighbourhood. Grass front lawns, consistent setbacks and mature trees are featured on the streets. Known heritage attributes include the residences at 155 William Street North, 147-149 William Street North, 130 William Street North, 121-123 William Street North, and 14 Elgin Street. Potential heritage attributes include the large collection of historical residential buildings, the size and massing of the	 Plate 15: 155 William Street North, which is designated under Part IV of the Ontario Heritage Act (A.S.I., 2023).

Feature I.D.	Type of Property	Address or Location	Heritage Status and Recognition	Description of Property and Known or Potential C.H.V.I.	Photographs/ Digital Image
				residential buildings, the architectural styles, the mature trees, and views to the Scugog River. Properties listed on the municipal heritage register that are located within this C.H.L.: • 14 Elgin Street • 147 -149 William Street • 130 William Street North • 121 – 123 William Street Properties designated under Part IV of the Ontario Heritage Act that are located within this C.H.L.: • 155 William Stret North (By-law 50-88)	 Plate 16: William Street North, looking North from just south of Colborne Street West (A.S.I., 2023).  Plate 17: William Street North, looking southwest towards Colborne Street West (A.S.I., 2023).

Feature I.D.	Type of Property	Address or Location	Heritage Status and Recognition	Description of Property and Known or Potential C.H.V.I.	Photographs/ Digital Image
C.H.L. 2	Streetscape	Lindsay Street North Streetscape	Potential C.H.L. – Identified during field review	This potential C.H.L. is located on the west side of Lindsay Street North between Rivera Park and slightly to the south of Bond Street East. The streetscape includes a collection of buildings that range in architectural styles and is representative of historical residential settlement patterns. Historical mapping indicates that settlement along this portion of Lindsay Street North began in the late nineteenth century, with the rest of the residential street filled in by the 1930s. The streetscape is located next to Rivera Park which was a former Rail and Lumber yard. Due to the small scale and simplistic architecture of these properties on the streetscape, it is likely that they may have been constructed to support workers. The properties on the streetscape range from one to one-and-a-half storey and feature narrow setbacks from the roadway. The Scugog River flows behind the properties. Potential heritage attributes include a variety of architectural styles, historical residential development pattern, particularly worker's housing development, and proximity to the Scugog River and the former Rail and Lumber yard. The 1938 topographical map (Figure 4) depicts the extant streetscape.	 Plate 18: Lindsay Street North Streetscape looking northwest from Bond Street (A.S.I., 2023).  Plate 19: Gothic Revival cottage next to Rivera Park along Lindsay Street North (A.S.I., 2023).

Feature I.D.	Type of Property	Address or Location	Heritage Status and Recognition	Description of Property and Known or Potential C.H.V.I.	Photographs/ Digital Image
C.H.L. 3	Residential	Colborne Street East/Lindsay Street North and St. Paul Street	Potential C.H.L. – Identified during field review	This potential C.H.L. is located around the intersection of Lindsay Street North/Colborne Street East and St. Paul Street. The streetscapes include residential properties from the early-to-mid twentieth century with some late-twentieth century residential infill. The properties contain houses which range from one to one-and-a-half storeys in height. The south side of Colborne Street East north of St. Paul Street features a row of Victory Housing that were likely constructed between the 1940s and 1950s. There are several mature trees throughout the area, particularly along St. Paul Street. Potential heritage attributes include the size and massing, the setback of the properties, the collection of Victory Housing along Colborne Street East, and the mature trees. The 1938 topographic map (Figure 4) depicts the west side of St. Paul Street and the north side of Colborne Street East as developed. The 1954 aerial photograph (Figure 5) shows the south side of Colborne Street East lined with properties as well.	 Plate 20: St. Paul Street looking south towards Lindsay Street North/Colborne Street East (A.S.I., 2023).  Plate 21: Victory Housing on the south side of Colborne Street East, looking west towards St. Paul Street (A.S.I., 2023).

Feature I.D.	Type of Property	Address or Location	Heritage Status and Recognition	Description of Property and Known or Potential C.H.V.I.	Photographs/ Digital Image
C.H.L. 4	Waterway	Scugog River	Potential C.H.L. – Identified during field review	The Scugog River is 85 kilometers in length and connects Lake Scugog and Sturgeon Lake. Much of the Scugog River runs through the community of Lindsay. There are several Provincially Significant Wetlands along the Scugog River, including the East Cross Creek No. 15 and Stoney Creek Headwaters. Archaeological sites near the river indicate an Indigenous presence in the area for thousands of years and the Mississaugas of Scugog Island First Nation have confirmed the use of the Scugog River as a travel corridor and resource collection area (Turner, 2022). The Scugog River was also integral in the development of the Euro-Canadian community of Lindsay. The first Euro-Canadian settlers in the area were William Purdy and his two sons who began to build a mill and dam along the Scugog River in 1830. The mill and dam impacted the surrounding landscape as it raised the water of the Scugog River by nearly seven feet in some areas. In effect, this created Lake Scugog and made the river more navigable. Purdy's Mill also spurred more settlement of the area and is the foundation for the community of Lindsay. The importance of the Scugog River is recognized by an Ontario Heritage Trust Plaque located at Riverside Cemetery, Lindsay Street (Kawartha Conservation, 2022; Ontario Heritage Trust, 2018; Turner, 2022)	 Plate 22: Scugog River, looking south from Rivera Park (A.S.I., 2023).

Figure 7: Location of Identified Built Heritage Resources (B.H.R.) and Cultural Heritage Landscapes (C.H.L.) in the Study Area

5.0 Results and Mitigation Recommendations

The results of background historical research and a review of secondary source material, including historical mapping, indicate a study area with an Indigenous land use of thousands of years, and a Euro-Canadian residential and industrial land use history dating back to the mid nineteenth century. A review of federal, provincial, and municipal registers, inventories, and databases revealed that there is one known built heritage resource (B.H.R.) in the Colborne Street Bridge study area. An additional three potential B.H.R.s and four potential cultural heritage landscapes (C.H.L.s) were identified during the background information review and fieldwork.

5.1 Key Findings

A total of four B.H.R.s and four C.H.L.s were identified within the study area:

- Of the eight identified B.H.R.s and C.H.L.s, one is designated under Part IV of the *Ontario Heritage Act* (B.H.R. 1).
- Within C.H.L. 1, there are four properties listed on the municipal heritage register (14 Elgin Street, 121-123 William Street North, 130 William Street North, and 147-149 William Street North) and one property designated under Part IV of the *Ontario Heritage Act* (155 William Street North).
- Identified B.H.R.s and C.H.L.s are historically, architecturally, and contextually associated with land use patterns in the City of Kawartha Lakes and more specifically representative of the settlement and development of the community of Lindsay along the Scugog River.

5.2 Recommendations

Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid unintended negative impacts to identified B.H.R.s

and C.H.L.s. Avoidance measures may include, but are not limited to: erecting temporary fencing, establishing buffer zones, issuing instructions to construction crews to avoid identified features, etc.

2. Once detailed designs of the proposed work are available for review, this report will be updated with a confirmation of impacts of the undertaking on the B.H.R.s and C.H.L.s identified within the study area and will recommend appropriate mitigation measures. Mitigation measures may include, but are not limited to, completing a property-specific heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.

3. Should future work require an expansion of the study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential B.H.R.s and C.H.L.s.

4. The existing conditions report should be submitted to the City of Kawartha Lakes for review and comment. Once the report is updated with the preliminary impact assessment of the preferred alternative, the report should be submitted to the City of Kawartha Lakes and the Ministry for review and comment, and any other local heritage stakeholders that may have an interest in this project. The final report should be submitted to the City of Kawartha Lakes for their records.

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Colborne Street Bridge Detailed Design

Drainage and Stormwater Management Report

FINAL

Project number: B001592

February 6, 2026

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Engineering for **people**

The City of Kawartha Lakes

Colborne Street Bridge Detailed Design

Drainage and Stormwater Management Report

Project Number: B001592

PREPARED BY: February 6, 2026

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Revision History

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1	May 30, 2025	Yuan Yuan, EIT	Madhav Baral, P.Eng.	Akram.Khan, P.Eng.
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1. Introduction

1.1. Project Description

The City of Kawartha lakes has retained CIMA+ to complete the detailed design for a new bridge over Scugog River to connect Colborne Street East and Colborne Street West. The study area is shown in **Figure 1** below.

Scugog River forms a natural barrier in Lindsay for several east-west routes through the community, one of these arterial routes being Colborne Street. The need for additional capacity was first recognized in 1960 and later reconfirmed in the 1970's and 1980's. In response to this identified need, Victoria County (now the City of Kawartha Lakes) completed a Class Environmental Assessment Study in 1994 (by TSH) and subsequent EA Amendment in 2000 (by Cole Sherman Associates) for a new crossing over the Scugog River. The Colborne Street right-of-way was selected as the preferred location for the crossing.

Figure 1: Study Area Location

The project includes a new two-lane bridge over Scugog River, a new access road to maintain a connection to Carew Park from William Street North, the widening of the William Street North/Colborne Street West intersection, and the realignment of Colborne Street East/Lindsay Street North intersection. Under existing conditions, Colborne Street

West naturally drains towards Scugog River, while runoff from Colborne Street East drains northerly to Sinister Creek, which discharges directly to Scugog River. Some erosion was observed along Sinister Creek while Scugog River appears to be relatively stable. Under proposed conditions, runoff conditions west of Scugog River will be maintained and runoff from the new bridge crossing and east of Scugog River will be discharged directly to Scugog River. The entire study area is within the jurisdiction of the Kawartha Conservation Authority (KCA).

1.2. Study Purpose

This Drainage and Stormwater Management (SWM) Report identifies the relevant characteristics of the existing and proposed drainage systems, documents the hydrologic assessments to determine the flow related to stormwater management design, hydraulic assessment of the bridge, reconfiguration of existing drainage features as well as design of new drainage features to accommodate the proposed improvements.

1.3. Scope of Work

The scope of work entails the following:

- Understand thoroughly the characteristics of the existing drainage system, its flow pattern, constraints, and design requirements based on the latest standards and policies.
- Prepare drainage mosaics illustrating the drainage areas, outlet points and stormwater management facilities.
- Estimate existing and proposed condition flow rates (for road corridor and external area) and determine if any peak flow control is required.
- Conduct hydraulic assessment of the bridge to determine the impact of the bridge water surface elevations.
- Develop SWM strategy using SWM best management practice (BMP) based on the Ministry of Environment, Conservation and Parks (MECP) Design Guidelines, City of Kawartha Lakes Infrastructure Guidelines, including requirements from other reviewing agencies to provide quality treatment for runoff generated within the project area.
- Explore the possibility of Low Impact Development (LID) measures and analyze quality and quantity control requirements according to the City's and KCA's guidelines.

All project related maps and figures are included in **Appendix A**.

1.4. Potential Drainage Impacts

Road improvement projects can affect drainage patterns and watercourse characteristics due to increased impervious areas and other roadway works. Some potential impacts include:

- Increased runoff (affecting peak flow rate and the erosion potential of the receiving watercourse).
- Increased pollutant and sediment loading within stormwater and meltwater runoff.
- Physical changes to watercourse morphology (i.e., base flows, flooding levels, and water quality).
- Physical changes to drainage boundaries.
- Physical changes to hydrologically significant features (i.e., existing ponding areas, dams, zones of infiltration, etc.)

2. Background Information and Site Description

2.1. Background Information Review

The following documents have been reviewed as a part of the study:

- City of Kawartha Lakes Infrastructure Guidelines, 2025
- Stormwater Management Planning and Design Manual, 2003 of Ministry of Environment, Conservation and Park (MECP) (former MOE)
- Highway *Drainage Design Standards,* Ontario Ministry of Transportation (MTO), 2008
- Erosion and Sediment Control Guide for Urban Construction, TRCA 2019
- Soil Survey Reports ON25, Soil Survey Reports for Victoria County, 1957
- Land Information Ontario, 5 m Contours data
- Scugog River Crossing Class Environmental Assessment Environmental Study Report, January 1994
- Scugog River Crossing-Phase 2 Colborne Street Bridge, addendum to the 1994 ESR, by Cole, Sherman & Associates, 2000
- Report on Soil Conditions Scugog River Crossing, Site Investigation Services Limited, 1992
- Colborne St. Pumping Station General Civil As-built Drawings, 2020
- As-built drawing containing Plan and Profile of Colborne Street East from 95 m west of St. Paul Street to 65 m east of St. Paul Street, Totten Sims Hubicki Associates Limited (Current AECOM), 2022.
- As-built drawing containing Plan and Profile of Colborne Street West, Ainley Consulting Engineers Planners, 2020
- As-built drawing for the William Street Reconstruction Project, Engage Engineering Ltd, May 2024
- Trent River Watershed Hydro-Technical Study and Dam 1 Dam Safety Review, Phase II - Hydro-Technical Study, Flood Flows Estimation Study Report – Final, AECOM, 2011
- Trent-Severn Waterway, Lindsay Lock, Dam and Weir Reconstruction, Park Canada
- Scugog River Flow and Daily Gauge Height and Discharge from Lindsay Dam to Scugog River for year 1989, Park Canada
- Daily Gauge Height and Discharge from Lindsay Dam to Scugog River from year 1914 to 1952, Park Canada

2.2. Site Description

The CIMA drainage team visited the project site in August 2023 for a field investigation of the existing drainage features and culvert crossing. The following office and field tasks were completed during the site reconnaissance:

- Reviewed existing background information of previous studies.
- Conducted a physical inspection of existing road ditches, catch basins, ditch inlets, and crossing structures.
- Confirmed drainage divides along the roadway and side roads which were needed to confirm the drainage mosaic.
- Prepared a photographic inventory of various drainage features. Site photos can be found in **Appendix B**.

Storm runoff of existing Colborne Street East drains to roadside ditches as well as storm sewer system and discharges to Sinister Creek.

Storm Runoff from existing Colborne Street West drains through existing storm sewers as well as overland and discharges into Scugog River.

The existing 3660 mm span x 1828 mm rise box culvert for Sinister Creek crossing at Colborne Street East is considered to be in good condition.

3. Design Standard and Criteria

3.1. Design Criteria

This section provides an overview of the SWM design criteria for the study area. The criteria is based on the City of Kawartha Lakes Infrastructure Guidelines (2025), Ministry of the Environment, Conservation and Parks (MECP) and the Ontario Ministry of Transportation (MTO) Highway Drainage Design Standards (2023).

3.1.1. City of Kawartha Lakes Requirements

The requirements of the City of Kawartha Lakes include:

- All new SWM facilities shall provide as a minimum the Enhanced level of protection as specified in the Stormwater Management Planning and Design Manual (MOE, 2003).
- Post-to-pre quantity control shall be provided unless otherwise directed by the City or Conservation Authority.
- Sites $\leqslant$ 5 ha (e.g. site plans or infill sites) shall minimize any anticipated changes in the water balance between pre-development and post-development conditions and shall provide a minimum infiltration equivalent to the first 5 mm of any given rainfall event.
- Storm sewer shall be designed to convey the 5-year design storm.
- Time of Concentration (Tc) calculated in the storm sewer designs is 10 min at the head of the system plus pipe flow time.

3.1.2. MECP Design Requirements

The MECP Stormwater Management Planning and Design Manual 2003 includes the following guidelines for runoff quality and quantity control.

- Additional stormwater runoff from new pavement can impact receiving watercourse and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces.
- A Stormwater Management Plan should be prepared in accordance with the MECP Stormwater Management Planning and Design Manual 2003.

3.1.3. MTO Hydraulic Design Standards

The MTO's *Highway Drainage Design Standards* prescribe standards for designing Surface Drainage Systems (SD) and Water Crossings (WC).

- Standard **WC-1** identifies the design flow for a bridge of span more than 6m for an urban arterial road, which is the 100-year flow.
- Standard **WC-2** the soffit clearance and freeboard for a bridge. As per this standard:
  - The minimum required freeboard is 1.0 m, which is measured vertically from the high-water level for the design flow to the edge of the travelled lane.
  - The minimum required clearance of 1.0 m is measured vertically from the high-water level for the design flow to the lowest point on the soffit.
- Standards **WC-4** and **SD-3** identify flow spread on to travel lanes across the bridge. These standards note the maximum allowable spread distance onto the travel lanes and the maximum depth of flow at the edge of the travel lanes. For an arterial road, the maximum lateral spread distance shall be such that a minimum of 2.5 m of the lane adjacent to median barrier or curb remains clear of any flooding.

3.1.4. Rainfall IDF and Storm Distribution

A review of the Intensity-Duration-Frequency (IDF) data included in the City of Kawartha Lakes Infrastructure Guidelines (2025), The parameters are summarized in **Table 1,** along with the 12-hour and 24-hour rainfall depths for the Lindsay Filtration Plant Station.

Table 1: Rainfall IDF Information for Lindsay Filtration Plant Station

Parameters	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	858	1214	1487	1898	2110	2518
B	6.8	9.0	10.2	11.7	12.0	13.2
C	0.822	0.847	0.858	0.871	0.870	0.882
12-Hr Rainfall Depth (mm)	45.8	54.8	62.3	72.9	81.5	89.8
24-Hr Rainfall Depth (mm)	52.0	61.2	69.2	80.3	89.9	98.2

3.2. Design Approach

The linear nature of the roadway project presents challenges in addressing drainage and stormwater management impacts associated with the roadway rehabilitation. Some of these challenges include land availability, utility conflicts, operations and

maintenance, etc. Due to the characteristics of the subject area and proposed roadway realignment, the stormwater management assessment will have the following approach:

- Documentation of existing conditions including identification of outlets, existing ditches, drainage topography, soils, land use, flood limits and other relevant drainage features and constraints.
- Evaluation of the existing and proposed hydrology flows and associated impacts to the receiving watercourse due to the proposed bridge crossing and associated roadway widening and realignment.
- Evaluation of the existing and proposed hydraulic impacts to the receiving watercourse due to the proposed bridge crossing.
- Assess the required stormwater management quality, quantity control and erosion control measures and explore the possibility to meet the water balance target.
- Identifying potential opportunities to implement Low Impact Development features.

4. Drainage and Hydrologic Analysis

4.1. Existing Drainage Conditions

This section provides details about the existing land use, soil and drainage conditions of the study area.

Exhibits 1 and **2** illustrate drainage mosaics of the study area under existing conditions. All figures are included in **Appendix A.**

4.1.1. Existing Soil and Land Use

Land use was assessed using ortho imagery. Existing land use along the west portion of Colborne Street is predominately single family residential, a three-story Senior's residence on the south-east corner of the Colborne Street West / William Street intersection and Carew Park Apartment on the west riverbank. Existing land use along Colborne Street East is characterized mainly by single family residential, commercial, and vacant lots.

Based on Ontario Soil Surveys Reports ON25, the *Soils of the Victoria County* indicate the entire study area consists of Solmesville and Otonabee. As per MTO soil group hydrologic chart, the hydrologic soil types for Solmesville and Otonabee are "C" and "B", respectively.

Report on Soil Conditions Scugog River Crossing (1992) was reviewed for subsurface condition of the project. Three boreholes were drilled near the proposed bridge structure crossing. According to the bore hole information, silty sand (Fill) which consists primarily of brown silt and sand soils with some gravel and a trace of clay was encountered on both sides of the river which extends to depths from 1 to 2 m below surface. The fill material consists of clayey silt with traces of gravels. 1-meter-thick organic silt deposits were encountered underlying the silty sand in each of the boreholes except BH 102. At each borehole, 400 mm thick silty sand (Till) was encountered underlying the organic material. Limestone bedrock was encountered in BH 101 at approximate elevation 245.8 m and the level of the adjacent river was approximately at elevation 248.2 m at the time of investigation.

4.1.2. Existing Drainage Pattern

Under existing conditions, Colborne Street West and East drains towards the Scugog River. There is an existing 3660 mm span x 1828 mm rise concrete box culvert for Sinister Creek crossing on Colborne Street East within the study area. There is no

existing stormwater management system which provides the quantity and quality treatment of road runoff.

As shown in the existing conditions drainage mosaics **Exhibit 1** and **Exhibit 2**, provided in **Appendix A**:

- Runoff from Catchments 100 (drainage area 0.40 ha) and 105 (drainage area 4.62 ha) is conveyed by existing storm sewers southerly along William Street North which ultimately discharges into the Scugog River. The drainage boundary of external Catchment 105 follows the pervious design by Engage Engineering Ltd. for William Street Reconstruction Project. This outlet falls outside of the current study limit.
- Runoff from Catchment 110 (drainage area 0.71 ha) drains overland to an existing catch basin on existing Colborne Street West and discharges to Scugog River.
- Runoff from Catchment 120 (drainage area 0.11 ha) drains overland easterly to the Scugog River.
- Runoff from Catchment 140 (drainage area 0.11 ha) drains southwards along Lindsay Street North and get conveyed by existing storm sewers which ultimately outlets to Scugog River. This outlet falls outside of the current study limit.
- Runoff from Catchment 150 (drainage area 0.31 ha) drains overland towards the existing grass swale on the west side of Lindsay Road North. The flow is further conveyed northerly and discharged to Sinister Creek at the downstream of the existing 3660 mm x 1828 mm box culvert at St 2+313.
- Runoff from Catchment 160 (drainage area 0.34 ha) is conveyed by existing storm sewer along Colborne Street East and discharged to Sinister Creek at the downstream of the existing 3660 mm x 1828 mm box culvert at St 2+313.

4.1.3. Existing Condition Hydrologic Modelling

The purpose of the hydrologic modelling was to simulate the hydrologic response of the areas contributing drainage with the study limit during various return period rainfall events. The hydrologic event simulation modelling is completed using the Visual OTTHYMO hydrologic modelling tool.

The methodology used to develop the hydrologic model can be summarized as follow:

- Drainage area boundaries were defined based on contours.

- Modelling parameters were estimated for each drainage area based on the delineated catchments, land use (confirmed with a topographic mapping and aerial photo), soil type and slopes of the overland and channel flow paths.
- The hydrologic response for drainage areas with a directly connected impervious land use greater than 20 percent was simulated using the Standard instantaneous unit hydrograph (STANDHYD).
- The hydrologic response for drainage areas with a directly connected impervious land use less than 20 percent was simulated using the Nash instantaneous unit hydrograph (NASHHYD).
- Runoff hydrographs were generated at key points of interest.

Hydrologic assessment was carried out using the 4-hour Chicago and the 6-hour, 12-hour and 24-hour SCS Type II Storm Distributions as per City of Kawartha Lakes Infrastructure Guidelines. IDF data provided in the City of Kawartha Lakes Infrastructure Guidelines was used for the hydrologic modelling.

Among these four different design storm distributions, the one which yields the highest pre-development peak flow will be considered to have a conservative design in the post-development.

The existing conditions hydrologic modelling input parameters as well hydrologic modelling schematic and summary output files for each drainage area are included in **Appendix C**.

Table 2 summarizes and compares the results of the existing conditions hydrologic modelling which was carried out using the four different storm distributions. The table shows comparison at specific node point and catchments. The node points and catchments are shown in hydrologic modelling schematic. Hydrologic analysis for Catchments 100, 105 and 140 are excluded as their outlets fall outside of the study limit.

Table 2: Summary of Existing Conditions Hydrologic Modelling

Catchment/ HYD ID	Storm Duration and Distribution	Flow (m^3/s)					
		2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
122	**4hr-Chicago**	**0.081**	**0.098**	**0.113**	**0.142**	**0.160**	**0.180**
	6hr-SCS	0.065	0.083	0.100	0.126	0.146	0.166
	12hr-SCS	0.065	0.082	0.098	0.122	0.141	0.159
	24hr-SCS	0.069	0.085	0.101	0.125	0.144	0.161
Hydrograph 122 provides the total flow from Catchments 110 and 120 that is discharging to the Scugog River from the west bank.							

Catchment/ HYD ID	Storm Duration and Distribution	Flow (m^3/s)					
		2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
162	**4hr-Chicago**	**0.098**	**0.118**	**0.135**	**0.158**	**0.176**	**0.195**
	6hr-SCS	0.076	0.094	0.109	0.130	0.148	0.167
	12hr-SCS	0.072	0.090	0.104	0.124	0.141	0.157
	24hr-SCS	0.078	0.094	0.107	0.126	0.144	0.160
Hydrograph 162 provides the total flow from Catchments 150 and 160 that is discharging to the Scugog River from the east bank.							
167	**4hr-Chicago**	**0.179**	**0.216**	**0.248**	**0.300**	**0.336**	**0.375**
	6hr-SCS	0.141	0.177	0.209	0.256	0.294	0.333
	12hr-SCS	0.137	0.172	0.201	0.245	0.281	0.316
	24hr-SCS	0.147	0.178	0.208	0.251	0.288	0.321
Hydrograph 167 provides the total flow from Catchments 110, 120, 150 and 160 that drains to the Scugog River.							

Out of four storm distributions, the 4-hour Chicago storm distribution generated the highest pre-development peak flow in all the drainage catchments, therefore it is considered as the governing pre-development flow.

4.2. Proposed Drainage Conditions

4.2.1. Proposed Drainage Pattern

In the proposed drainage pattern, while all runoff from the roadway area and external area within the study limit still ultimately drains into Scugog River, notable changes are expected compared to the existing conditions due to the urbanization of Colborne Street West, as well as development of access road and the two-lane bridge crossing. As a result, there will be some increase in impervious area. New storm sewers and catch basins will be installed along access road and Colborne Street to capture minor storm runoff from the roadway area.

Exhibit 3 and **Exhibit 4** illustrate drainage mosaics of the study area under proposed conditions, which is included in **Appendix A**. Discussion on the proposed drainage conditions is as follows:

- There is no change in the drainage pattern and drainage area for Catchment 100 (drainage area 0.40 ha) and 105 (drainage area 4.62 ha) and the existing outlet is maintained under proposed conditions. Due to the development of access road and adjustment of William Street North/ Colborne Street West

intersection, there is a minor increase in imperviousness from 0.43 ha to 0.45 ha.

- The existing Catchments 110 and 120 are split into Catchments 112 (drainage area 0.32 ha), 115 (drainage area 0.33 ha) and 120 (drainage area 0.17 ha), respectively under the proposed condition. Runoff from Catchment 120 will be conveyed by proposed storm sewers along Colborne Street West and connects to the storm sewers on proposed access road. The combined with the runoff from Catchments 120, 112 and 115 discharges to Scugog River at the west riverbank from the existing outlet location. The existing outlet will be upgraded with new storm sewer. There is no change in the total drainage area (0.82 ha) that discharge to Scugog River from west bank, but the impervious area has increased from 0.34 ha (41%) to 0.45 ha (54%).
- There is no change in the drainage pattern for Catchment 140, and outlets to Scugog River as in existing condition. The road realignment makes minor impact to the drainage area which decreased from 0.11 ha to 0.09 ha under proposed condition and impervious area also decreased to 0.07 ha. Therefore, the proposed improvement does not provide any impact to this outlet.
- Catchment 130 (drainage area 0.13 ha) is the area of proposed bridge crossing over Scugog River. The proposed bridge will be 76 m long and 14.52 m wide. It is designed to accommodate a 3.5 m wide traffic lane, a 1.0 m paved shoulder and a 2.0 m sidewalk on each side (refer to **Figure 2**). Runoff from Catchment 130 drains easterly and get captured by proposed storm sewers on Colborne Street East and discharge to Scugog River. The proposed storm sewers also convey the flow from Catchment 150 (drainage area 0.38 ha).
- There is no change in the drainage pattern for Catchment 160 and the existing outlet is maintained under proposed conditions. However, the drainage area has decreased from 0.34 ha to 0.28 ha due to the removal of existing storm sewers west of the Sinister Creek box culvert, the impervious area has deceased from 0.24 ha (72%) to 0.19 ha (68%).
- The overall total drainage area that discharging to Scugog River has increased from 1.46 ha (Catchments 110, 120,150 and 160) to 1.61 ha (Catchments 112,115, 120, 130, 150 and 160) and the impervious area has been increased from 0.75 ha (51%) to 1.07 ha (66%).

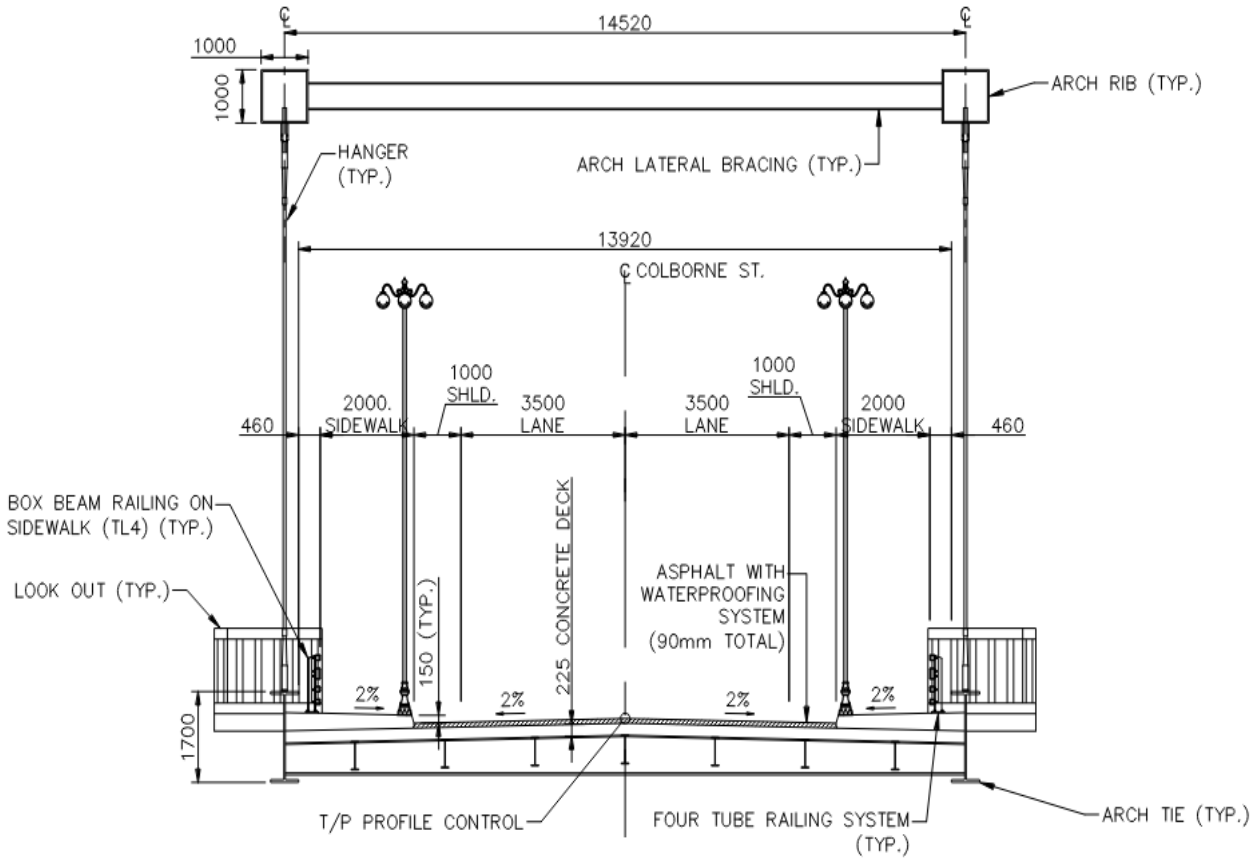

Figure 2: Colborne Street Bridge Configuration

4.2.2. Proposed Condition Hydrologic Modelling

The proposed conditions hydrologic modelling input parameters as well hydrologic modelling schematic and summary output details are included in **Appendix C**.

Table 3 summarizes the results of the proposed conditions hydrologic modelling as well as comparison with existing conditions for the 4-hour Chicago storm distributions at specific node point and catchments. The peak flows were assessed at the cumulation of drainage areas entering Scugog River from separate locations.

Table 3: Summary of Proposed Conditions Hydrologic Modelling

Catchment/ HYD ID	Scenario	Drainage Area (ha)	Flow (m^3/s) (4-hr Chicago)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
122	Existing	0.82	0.081	0.098	0.113	0.142	0.160	0.180
122	Proposed	0.82	0.107	0.130	0.148	0.175	0.197	0.219
	Diff. (Pr-Ex)	**0**	**0.026**	**0.032**	**0.035**	**0.033**	**0.037**	**0.039**

Catchment/ HYD ID	Scenario	Drainage Area (ha)	Flow (m^3/s) (4-hr Chicago)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
• Hydrograph 122 provide the total flow from Catchments 110 and 120 under existing condition. • Hydrograph 122 provide the total flow from Catchments 110, 115 and 120 under proposed condition.								
162	Existing	0.64	0.098	0.118	0.135	0.158	0.176	0.195
162	Proposed	0.79	0.147	0.177	0.200	0.232	0.258	0.284
	Diff. (Pr-Ex)	**0.15**	**0.049**	**0.059**	**0.065**	**0.074**	**0.082**	**0.089**
• Hydrograph 162 provide the total flow from Catchments 150 and 160 under existing condition. • Hydrograph 162 provide the total flow from Catchments 130, 150 and 160 under proposed condition.								
167	Existing	1.46	0.179	0.216	0.248	0.300	0.336	0.375
167	Proposed	1.61	0.254	0.307	0.348	0.407	0.455	0.504
	Diff. (Pr-Ex)	**0.15**	**0.075**	**0.091**	**0.100**	**0.107**	**0.119**	**0.129**
• Hydrograph 167 provide the combined flow from Catchments 110, 120, 150 and 160 that drains to Scugog River under existing condition. • Hydrograph 167 provide the combined flow from Catchments 112, 115, 120, 130, 150 and 160 that drains to Scugog River under proposed condition.								

The results provided in **Table 3** show that:

- The overall flow increases for the 100-year storm that discharge to Scugog River from Catchment 112, 115, 120, 130, 150 and 160 is 0.129 m^3/s due to the introduction of Colborne Street Bridge crossing and Access Road. Scugog River ultimately discharges to lake Scugog, as per the previous Scugog River Crossing Class Environmental Assessment Environmental Study Report (January 1994), quantity control is not required.

5. Watershed Hydrology and Hydraulics of the Bridge

5.1. Watershed Hydrology

Trent River Watershed Hydro-Technical Study and Dam 1Dam Safety Review report by AECOM (2011) was reviewed for flood flows estimation at Lindsay Dam Lock 33. The Flood Flows Estimation Study proposes a methodology for the estimation of the spring and summer-fall Probable Maximum Floods (PMF) in the Trent River Watershed as well as for the estimation of statistical flood flows for return periods of 2, 5, 10, 25, 50, 100 and 500 years.

As noted in the *Dam Safety Review Report* by AECOM, the total drainage area at the downstream of Landsay Dam (Lock 33) is 1014 km^2. The Sinister Creek drainage area at the junction of Scugog River is 6.8 km^2. The total drainage area of Scugog River at the downstream of Sinister Creek junction is 1020.8 km^2, i.e. 102080 ha. The *Dam Safety Review Report* also provided the unit flood flow per 100 km^2 (refer Table 7 of *Dam Safety Review Report*, AECOM 2011).

Exhibit 5, included in **Appendix A**, shows the overall drainage mosaics for the Scugog River watershed.

Table 4 summarizes the results of unit flood flows in hundreds of km² for Scugog River watershed which is applied to the Scugog River watershed to the downstream of Lock 33 and to the downstream of Sinister Creek Junction.

Table 4: Summary of Flood Flows and Unit Flood Flows

Description	Flow at Scugog River and Sinister Creek Junction (m^3/s)						
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
Unit flood flow per 100 km^2	3.7	5.1	5.9	6.9	7.7	9.4	16.8
Flow of Scugog River downstream of Lock 33 (Area 1014 km^2)	37.5	51.7	59.8	70.0	78.1	95.3	170.4
Flow of Scugog River downstream of Sinister Creek Junction (Area 1020.8 km^2)	37.8	52.1	60.2	70.4	78.6	96.0	171.5

Note: Unit Flow rate per 100 km^2 is extracted from Table 7 of *Dam Safety Review Report*, AECOM 2011

5.2. Hydraulic Assessment of Scugog River Bridge

A new 1-D HEC-RAS hydraulic model is developed to simulate the hydraulic performance of Scugog River bridge at Colborne Street. Bathymetric survey of the creek was conducted to determine the river sections for the hydraulic model.

The HEC-RAS River sections location and 100-year flood line is shown in **Exhibit 6** and included in **Appendix A**.

The proposed Colborne Street Bridge over Scugog River is a steel bridge of 79.77 m span having a m clear opening of 77.70 m. The bridge geometry was added to the hydraulic model. The water elevations for existing and proposed condition were simulated with the HEC-RAS hydraulic model. **Table 5** summarizes upstream water elevations at immediately upstream of bridge at Section 186.86 under the existing and proposed condition for the 2, 5, 10, 25, 50 and 500-year storm events.

Table 5: Summary of Water Elevations Upstream of the Bridge

Storm Event	Peak Flow (m^3/s)	WSL Existing Condition, m	WSL Proposed Condition, m	Difference in WSL (Pr-Ex), m
2-yr	37.3	247.04	247.05	0.01
5-yr	51.7	247.32	247.33	0.01
10-yr	59.8	247.45	247.46	0.01
25-yr	70.0	247.60	247.60	0.00
50-yr	78.1	247.70	247.71	0.01
100-yr	95.3	247.90	247.90	0.00
500-yr	170.4	248.54	248.54	0.00

The hydraulic analysis for proposed bridge crossing shows that:

- The available freeboard is 3.12 m during the 100-year design storm at the road low point which meets the requirement.
- The clearance at the lowest point of bridge soffit us 4.28 m during the 100-year design storm, which meets the requirement.
- The lowest point of the bridge soffit is high enough and meet the navigation requirement of 4.2 m clearance over Scugog River during the 2-year design storm.
- The increase in water surface elevation under proposed condition upstream of the bridge is negligible compared to the existing condition.

The HEC-RAS output files under the existing and proposed conditions are included in **Appendix D**.

6. Stormwater Management System

6.1. General Overview

Under existing conditions, no stormwater management (SWM) measures exist to address the runoff quality and quantity control. The construction of bridge crossing and access road to Carew Park Apartment will impacts land use by increasing the imperviousness, thereby increasing the runoff. As discussed in **Section 4**, water quantity control measurement is not necessary for the study area; however, it is necessary to provide quality control of the runoff.

This section of the report documents the preliminary screening of SWM practices for the purpose of runoff quality treatment for the roadway areas. It should be noted that due to the limited area available along the linear infrastructure, there are limited possibility for the implementation of SWM practices.

The MOE (now MECP) Stormwater Planning and Design Manual has identified a broad range of stormwater management practices for the runoff quality control of the project. However, due to linear nature of the project and considering various utility constraints the recommended practices that can be implemented as part of this project is OGS unit for water quality control.

6.2. Impact of Proposed Bridge Crossing

As discussed in **Section 4**, the proposed road improvement and bridge crossing will cause some increase in imperviousness, as summarized below:

- The overall total drainage area that drains to Scugog River will increase from 1.46 ha (Catchments 110, 120, 150 and 160) under existing condition to 1.61 ha (Catchments 112,115,120,130,150 and 160) under proposed condition and the impervious percentage has increased from 51% to 66%.

6.3. Proposed Stormwater Management Measures

6.3.1. Quality Control

The quality control measure will be implemented to control the sediment laden runoff from the roadway area to the watercourse. Followings are recommended measures for water quality control:

- For Catchments 112, 115 and 120 (total drainage area 0.82 ha with 54% of imperviousness), an OGS unit (OGS #1) is proposed for the water quality treatment before discharging to the Scugog River. The recommended size for

OGS #1 is Stormceptor EFO6 or approved equivalent. This OGS will provide 61% of TSS removal efficiency for the CA ETV particle size distribution.

- For Catchments 130 and 150 (total drainage area 0.51 ha with 86% of imperviousness), an OGS unit (OGS #2) is proposed for the water quality treatment before discharging to Scugog River. The recommended size for OGS #2 is Stormceptor EFO5 or approved equivalent. This OGS will provide 60% of TSS removal efficiency for the CA ETV particle size distribution.

OGS sizing report is included in **Appendix E**.

6.3.2. Spread Analysis for the Colborne Street Bridge

A spread analysis and flow depth calculation were completed for the Colborne Bridge as per the MTO Drainage Management Manual to determine the depth of ponding and flow spread during the 5-year and 100-year storms. Runoff coefficients and time of concentration was set as per the City of Kawartha Lakes Infrastructure Guidelines. The bridge consists of 1.0m shoulder on both sides. The following is the criteria for flow spread according to MTO Drainage Design Standards:

- For Minor storm:
  - As a Desirable Standard, the Maximum Lateral Spread Distance shall be zero, such that the full lane width adjacent to a concrete barrier or curb remains clear of any flooding.
  - As a Minimum Standard, the Maximum Lateral Spread Distance shall be such that a minimum of 2.5 metres of the lane width adjacent to a concrete barrier or curb remains clear of any flooding.
  - The Maximum Depth of flooding at the lowest edge of the travel lanes shall not exceed 25 mm.
- For Major Storm (100-year)
  - The Maximum Lateral Spread Distance for a two lane roadway shall be such that the minimum width of the Open Roadway is 3.5 metres.

The results of spread analysis show that:

- During the 5-year minor storm event, the maximum depth of ponding on the roadway shoulder is 27.9 mm and the maximum flow spread is 1.39 m. The spread encroaches the lane by 0.39 m keeping 3.11 m of lane width free from flooding. At the edge of lane, the ponding depth is only 7.9 mm. The spread meets the minimum requirement for minor storm.

- During 100-year storm, the maximum depth on the roadway shoulder will be 32.6 mm and the maximum flow spread is 1.63 m. The maximum spread encroachment at the lane is 0.63 m and the flow depth at edge of lane us 12.6 mm. The spread meets the required for major 100-year storm.
- Since, the height of curb is 150 mm and the width of shoulder is 1.0 m, the overland flow would remain within the road ROW. This ponding depth will not impact the access to emergency vehicles.

Flow spread calculation details can be found in the **Appendix E**.

6.3.3. Proposed Storm Sewer

Under proposed conditions, new storm sewers will be provided along access road and Colborne Street. Proposed storm sewer capacities are analyzed using the City of Kawartha Lakes IDF data with the 5-year design storm. Storm sewers of size ranging from 300 mm to 525 mm diameter are proposed within the road ROW according to the City's guideline. The existing storm sewers east of existing Culvert Crossing on Colborne Street East will continue to function with some minor adjustment of catch basin locations and sewer leads. Sewershed boundary is shown in **Exhibits 7** and **8**.

Due to the widening of William Street North within the project limits, there is a minor increase in impervious area of approximately 0.02 ha along William Street North between Regent Street and Colborne Street West. While no adjustment to the storm sewer pipe size is required between Regent Street and Colborne Street North, adjustments to the proposed catch basin locations and associated sewer leads are required.

It should be noted that the existing pipe size from EXCBMH3 to EXMH33 along Colborne Street West is 1050mm diameter while the existing downstream pipe size on William Street North south of Colbourne Street West i.e., from EXMH33 southerly, reduces to 675mm diameter. A review of the downstream pipe capacity is therefore required in the future.

Storm Sewer Capacity Assessment sheets for proposed conditions are provided in **Appendix E**.

6.3.4. Low Impact Development Measures

Due to the steep profile of the roadway, there are few areas within the ROW that can be considered as potential areas for infiltration galleries to provide infiltration and water quality controls. As per the soil conditions discussed in **Section 4.1.1**, an infiltration rate of 10 mm/hr is assumed for the clay loam within the project site.

Table 6 below provides a summary of the required infiltration volume based on the 5 mm of rainfall depth.

Table 6: Water Balance Requirement

Catchment ID	Total Area (ha)	Runoff Volume Equivalent to 5 mm Rainfall Depth (m^3)
112, 120, 130, 140, 150, 160	1.37	68

From the table above, a total of 68 m^3 of runoff volume will need to be stored and infiltrated to meet the water balance requirement for the proposed roadway area. Due to the linear nature of the project as well as due to the constraints of various utilities and steep road profile, it may not be feasible to meet the full infiltration volume requirements, therefore, infiltration volume will be provided to the **maximum extent possible** and infiltration galleries are proposed within the project limit wherever practical.

Two 20 m long, 1.5 m wide infiltration galleries are proposed on the south side of proposed Access Road from St 7+070 to St 7+110. The depth of infiltration gallery will be 0.45 m. The infiltration gallery will provide 11 m^3 of retention volume which will eventually infiltrated into the ground at 48.0 hours of drawdown time.

Infiltration Gallery sizing details is included in **Appendix E**.

7. Sediment and Erosion Control

The erosion and sedimentation which occur during construction, if uncontrolled, can result in a loss of topsoil, a disruption of nearby watercourses and a degradation of downstream water quality. During construction, erosion and sedimentation control measures should be implemented to prevent the migration of soils from the site. The following recommendations should be considered when developing the detailed Erosion and Sedimentation Control drawings:

General

- Daily inspections are to be carried out particularly after rain events and repairs.
- Any in-water work that is necessary must be conducted in dry conditions within the appropriate fisheries timing window indicated by the conservation authority.

Vegetative

- All areas not subject to active construction 30 days after disturbance/ grading should be topsoiled and seeded as per OPSS.MUNI 802 & 804 immediately after completion of such grading.
- Immediately following seed application, a straw erosion control blanket should be installed on any exposed slopes adjacent to sensitive features, as per OPSS.
- The erosion control matting / blankets shall be fully biodegradable.
- Finished slopes will be graded to an acceptable slope and planted according to applicable guidelines. Large cuts should be terraced to minimize surface erosion.

Structural

- As construction proceeds, diversion swales, if required, should be graded where needed along the right-of-way boundaries to intercept drainage from external areas and direct it away from exposed surfaces.
- The locations of sediment / dewatering traps should be confirmed in the field by the on-site inspector and environmental inspector.
- Temporary sedimentation traps should be sized based on 125 m^3/ha of drainage area.
- The integrity of all sediment trapping devices should be monitored regularly (at least weekly and immediately following rain events) and properly maintained; such structures will be removed only after the soils of the

construction areas have been stabilized and then only after the trapped sediments have been removed.

- The contractor should identify a contingency plan for accidental sediment release.
- Straw bale flow and/or rock check dams should be provided in roadside ditches, especially in all ditches immediately upstream of their discharge into a watercourse.
- Additional erosion control works may be required during construction. These may consist of silt fences, swales, and/or diversion berms. The location and need for these works will need to be established in the field.

Temporary silt fencing should be installed:

- Around sensitive vegetative features.
- Approximately 2 m from the final toe-of-slope for the roadway embankment widening areas.
- Runoff from excavated areas or unvegetated soil will not be permitted to discharge off site or directly into active or temporary watercourses or any natural areas.
- Heavy duty silt fence should be used at crossing locations where rare species are present.
- The contractor should abide by the requirements set out in the Sustainable Technologies *Erosion and Sediment Control Guideline for Urban Construction* (2019).

LID Protection:

- Where possible plan for the LID construction late in the construction project.
- Clear signage is critical to protecting LID areas, and signage indicating ‘no heavy equipment’ is particularly important for intended infiltration areas to avoid compaction of native soil in LID areas.
- Perimeter controls should be installed early and kept in place until the site is stabilized, and vehicles are no longer tracking mud onto the pavement surfaces that drain into the LID measure.
- LIDs that are kept offline during construction require the installation and maintenance of an impermeable physical barrier at the inlet. For example, curb cuts that serve as inlets for bioretention areas can be blocked off from receiving flows with sandbags or wood.

- For LIDs that are receiving runoff, permeable barriers can be installed at the inlet to help settle and/or filter out suspended sediment before the water enters the infiltration area.
- ESC site inspections should be carried out weekly and before and after rain or snowmelt events to determine whether ESC measures installed are in good working order and functioning as intended.
- Stockpiles of construction materials should be stored down gradient of LIDs to the extent possible (≥ 30 m recommended), since they can be a significant source of sediment that may be washed into the LID area. Sediment controls (e.g. sediment fence, filter socks) should be installed around all stockpiles, particularly those that are located up gradient of LIDs.
- The underground infiltration facility should be kept offline until drainage area construction and stabilization are complete and vehicle mud tracking has ended.

The integration of these measures will minimize the impacts of erosion and sedimentation during the construction of Colborne Street bridge within project limits.

8. Conclusions

Based on the preceding assessments and findings for the proposed project, the following conclusions can be made:

1. It is proposed to develop a two-lane bridge crossing the Scugog River, access road for the reinstatement for a connection from Carew Park to road network, realignment of Colborne Street East/Lindsay Street North intersection as well as the addition of storm sewers.
2. Existing Conditions:
    - A Visual OTTHYMO hydrologic model was developed to generate existing and proposed flows from the roadway corridor using the 4-hour Chicago and the 6-hour,12-hour and 24-hour SCS Type II Storm Distributions. Out of four storm distributions, the 4-hour Chicago storm distribution generated the highest peak flow and therefore, considered as governing flow.
3. Proposed Conditions:

    Peak flow control is not required under proposed conditions; However, for the runoff quality control, two oil grit separator (OGS) units are proposed to improve the water quality of storm runoff before discharging into Scugog River:

    - The OGS #1 will be installed near St 2+117. The size of OGS #1 will be a Stormceptor® EFO6 or approved equivalent.
    - The OGS #2 will be installed near St 2+203. The size of OGS #2 will be a Stormceptor® EFO5 or approved equivalent.
4. A 1-D HEC-RAS model is developed to simulate the water surface elevation of Scugog River under existing and proposed condition. The proposed bridge will be 79.77 m span (centre to centre) and 14.52 m wide, with clear opening between the abutment of 77.7m.
    - The proposed bridge meets the necessary clearance and freeboard requirement for the 100-year design storm.
    - The proposed bridge has 4.2 m clear vertical opening from the 2-year water surface elevation which meets the navigable clearance requirement.
    - The increase in water elevation on the upstream of the bridge is negligible compared to the existing condition.

5. 300 mm to 525 mm diameter PVC and Concrete pipe storm sewers are proposed along proposed access road and Colborne Steet.
6. Two 20 m long, 1.5 m wide infiltration gallery is proposed on the southside of Access Road. The depth of infiltration gallery will be 0.45 m. The infiltration gallery will provide 11 m^3 of retention volume which will eventually infiltrated into the ground at 48.0 hours of drawdown time.
7. The size of existing storm sewer on William Street North to the south of Colbourne Street West is smaller than upstream storm sewer. It is recommended to review in the future.

A

Appendix A
Maps and Figures

FLOW DIRECTION

STORM SEWER

120 / 0.11ha — CATCHMENT ID / DRAINAGE AREA

DRAINAGE BOUNDARY

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTG U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING FOR STAKE OUT. THE CKL AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

REVIEWED BY:

BENCHMARK (S):

No.	REVISION	DATE	BY	APPROVED
1	ISSUED FOR 60% REVIEW	MAY 2025	Y.Y.	M.B.
2	ISSUED FOR 90% REVIEW	FEB 2026	Y.Y.	M.B.

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K9V 5R8
(705) 324-9411

ENGINEER'S STAMP

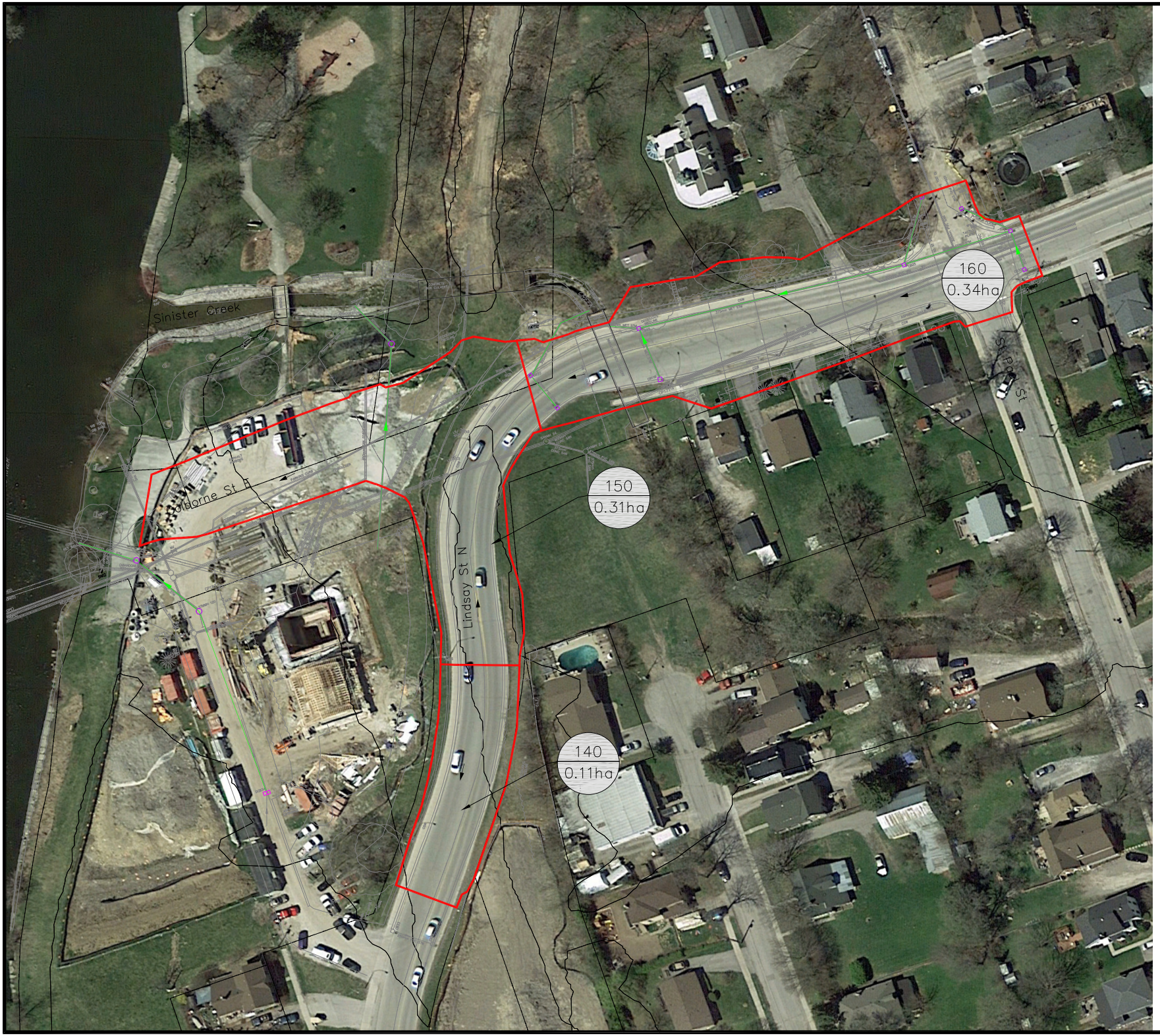
CONSULTANT

CIMA+

COLBOURNE STREET RECONSTRUCTION

EXISTING CONDITIONS DRAINAGE MOSAICS

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL: 1:500	DRAWING
DRAWN BY: Y. YUAN	VERTICAL	SHEET No: EXHIBIT 1
DATE: MAY 2025	CONTRACT NO: XXXX-XX-XX	



FLOW DIRECTION

STORM SEWER

120
0.11ha

CATCHMENT ID

DRAINAGE AREA

DRAINAGE BOUNDARY

N

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTG UG & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING FOR STAKE OUT. THE CKL AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

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EXISTING CONDITIONS DRAINAGE MOSAICS

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL: 1: 300	DRAWING
DRAWN BY: Y. YUAN	VERTICAL	SHEET No: EXHIBIT 2
DATE: MAY 2025	CONTRACT NO: XXXX-XX-XX	

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Kawartha Lakes

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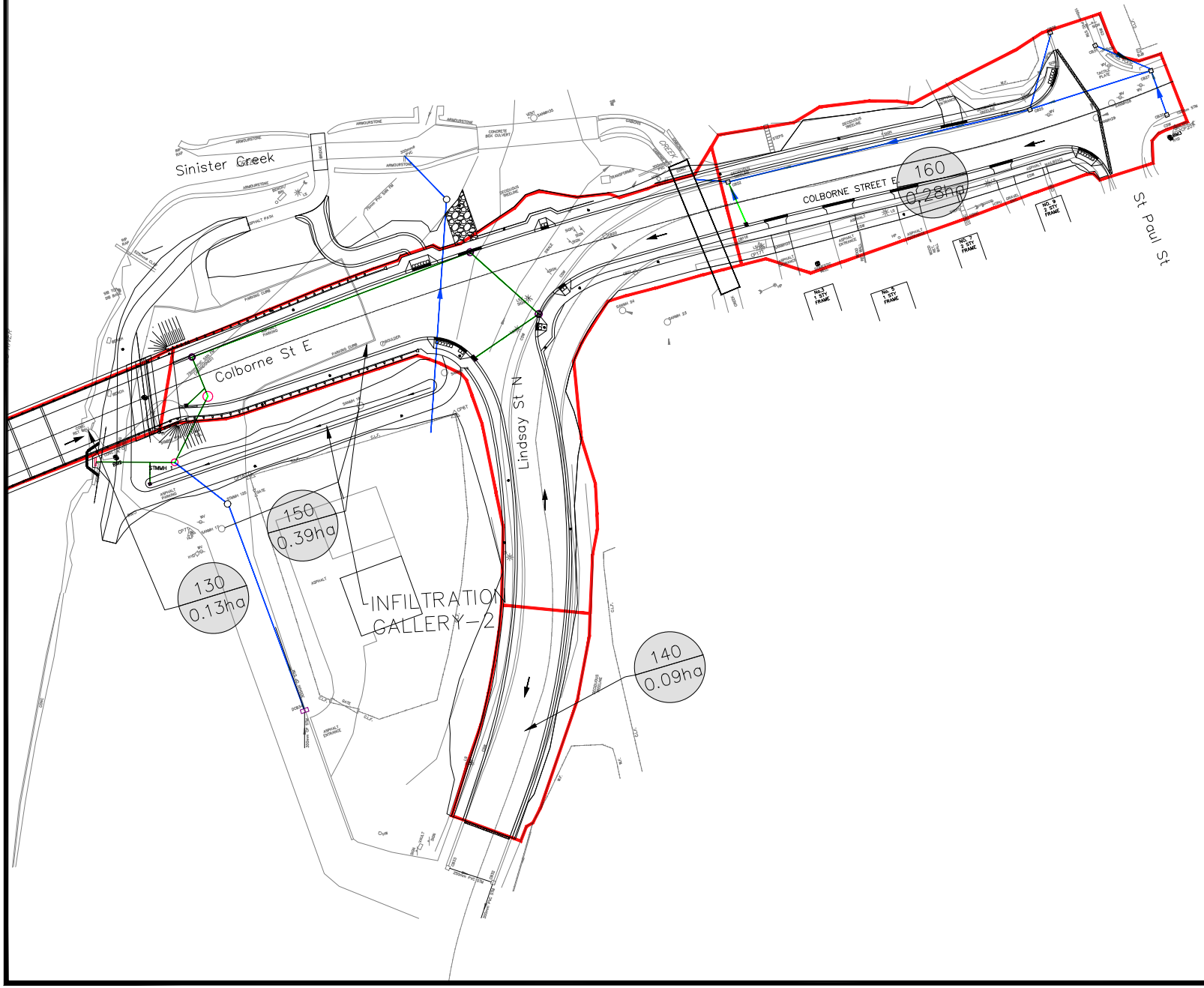
COLBOURNE STREET RECONSTRUCTION

PROPOSED CONDITIONS DRAINAGE MOSAICS

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL: 1:500	DRAWING:
DRAWN BY: Y. YUAN	VERTICAL:	SHEET No: EXHIBIT 3
DATE: MAY 2025	CONTRACT NO: XXXX-XX-XX	



→	FLOW DIRECTION
	PROP. STORM SEWER
	EXISTING STORM SEWER
120	CATCHMENT ID
0.11ha	DRAINAGE AREA
🟥	DRAINAGE BOUNDARY

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXIST'G U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING FOR STAKE OUT. THE CKL AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

REVIEWED BY

______________________ P. Eng ( ) C.E.T./C.Tech ( ) OTHER ( )

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DATE: ______________________________

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1	ISSUED FOR 60% REVIEW	MAY 30/25	Y.Y.	M.B.
2	ISSUED FOR 90% REVIEW	FEB 06/26	Y.Y.	M.B.

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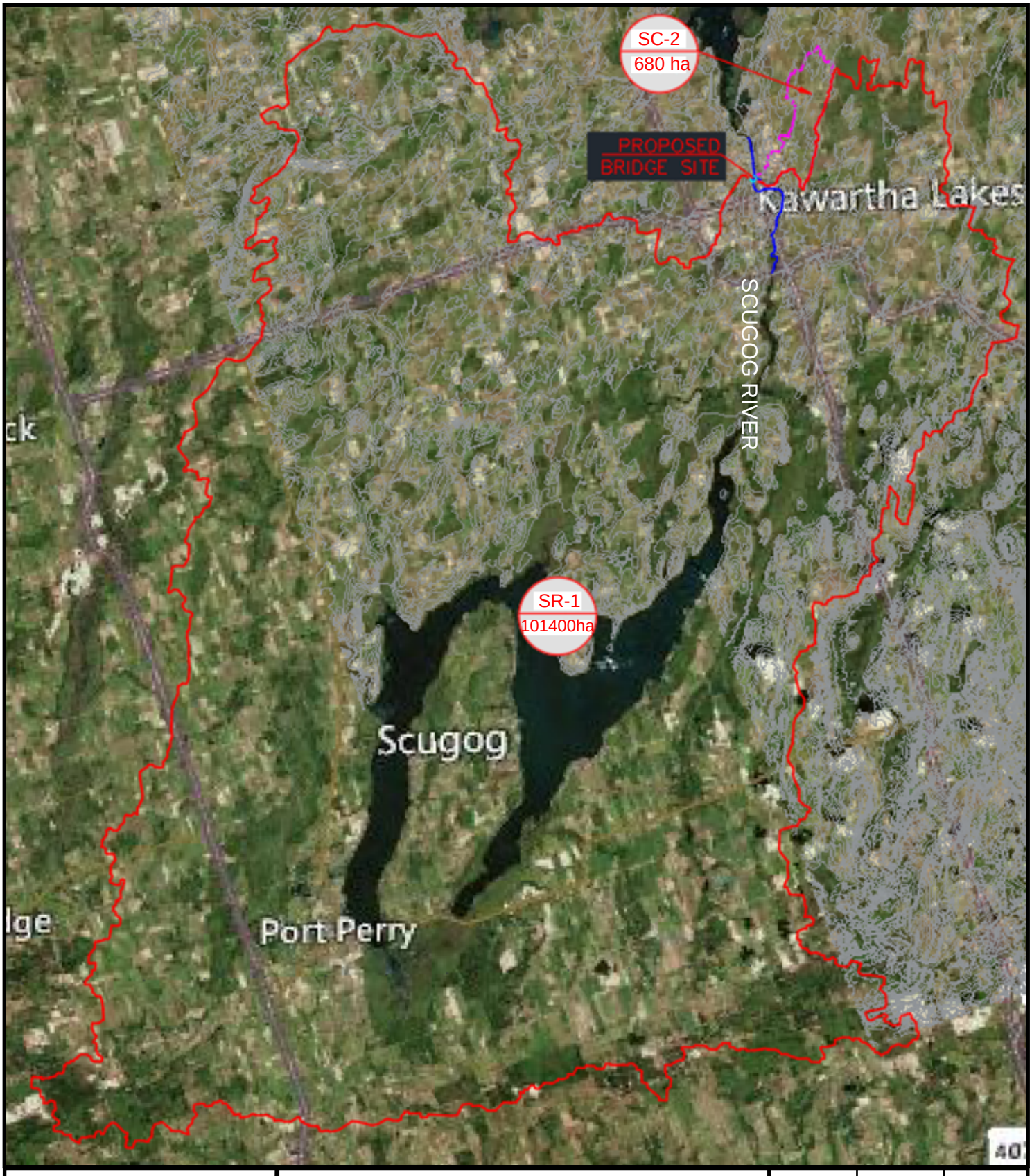
COLBOURNE STREET RECONSTRUCTION

PROPOSED CONDITIONS DRAINAGE MOSAICS

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL: 1:300	DRAWING:
DRAWN BY: Y. YUAN	VERTICAL:	SHEET No: EXHIBIT 4
DATE: MAY 2025	CONTRACT NO. XXXX-XX-XX	



Kawartha Lakes

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LINDSAY, ONTARIO
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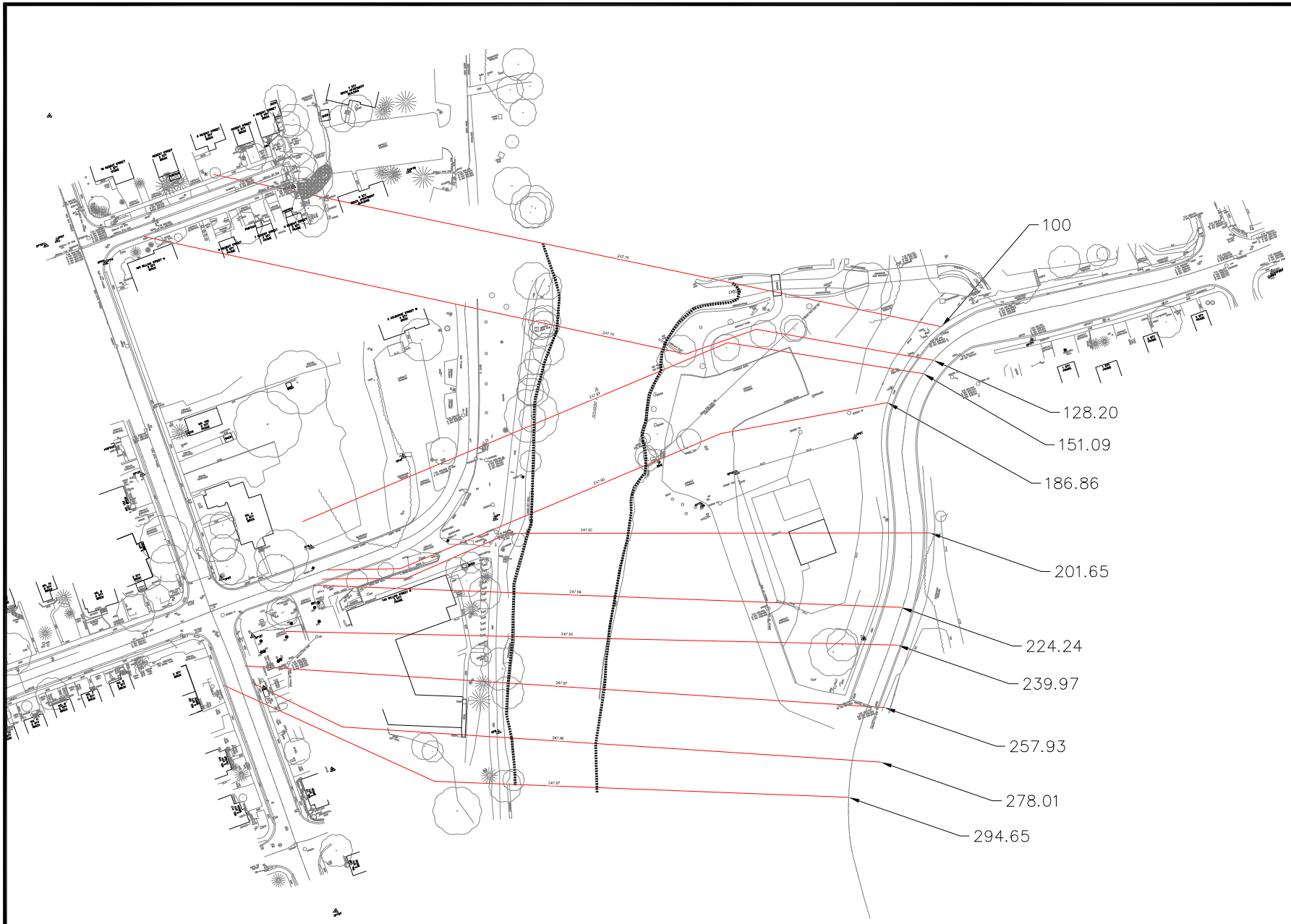
COLBORNE STREET RECONSTRUCTION

SCUGOG RIVER WATERSHED AT COLBORNE STREET

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL:	DRAWING:
DRAWN BY: Y. YUAN	VERTICAL:	SHEET No: EXHIBIT 5
DATE: MAY 2025	CONTRACT NO. XXXX-XX-XX	



100-YEAR FLOOD ELEVATION

294.65 SECTION ID

247.28

SECTION LINE

100-YEAR FLOOD LINE

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING UG & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING FOR STAKE OUT. THE CKL AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

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NO.	REVISION	DATE	BY	APPROVED
1	ISSUED FOR 80% REVIEW	MAY 2025	YJC	MJB

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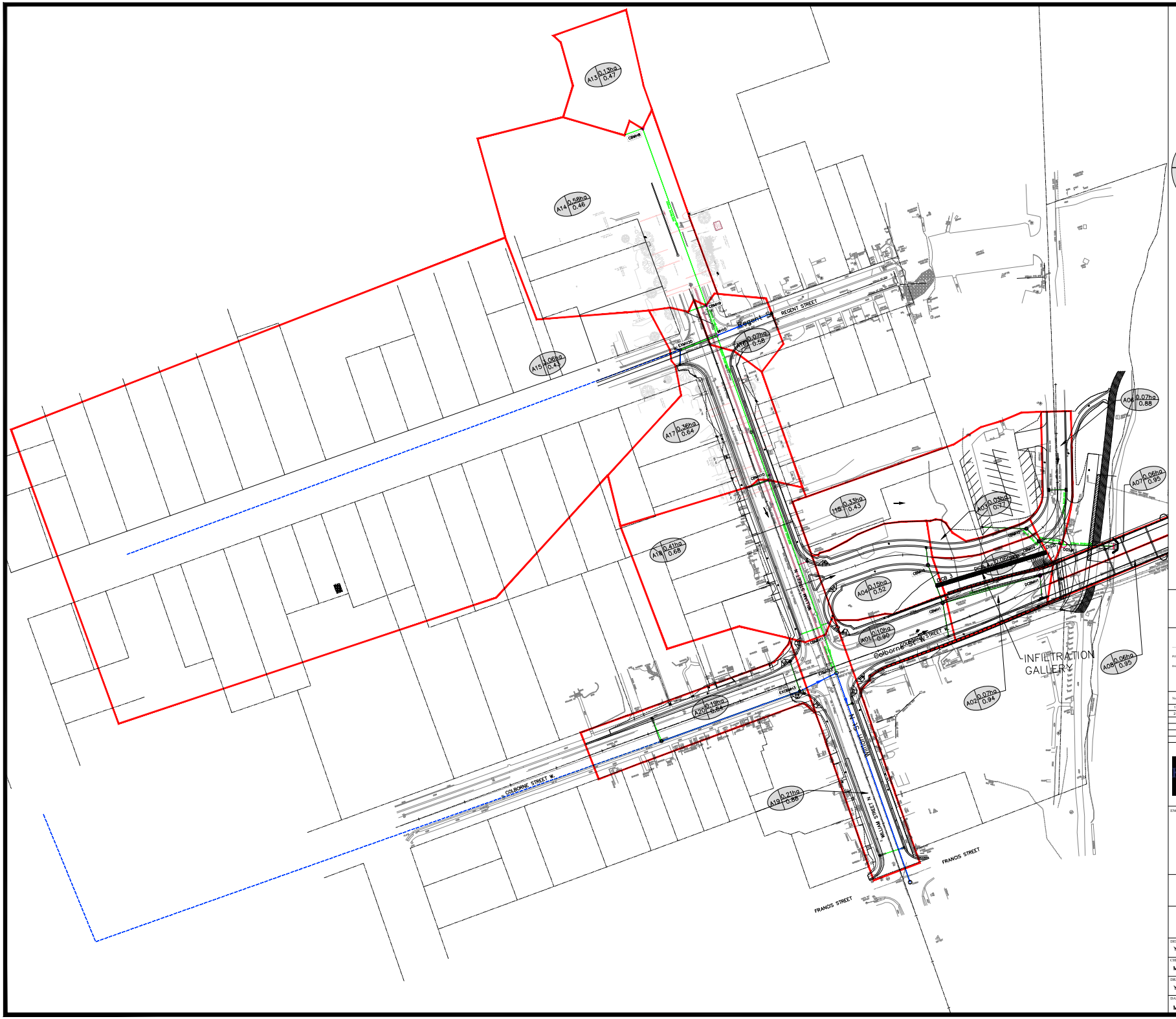
ENGINEER'S STAMP

CONSULTANT

COLBOURNE STREET RECONSTRUCTION

HEC-RAS SECTION LOCATION AND 100-YEAR FLOOD LINE

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL: 1: 2000	DRAWING
DRAWN BY: Y. YUAN	VERTICAL:	SHEET No: EXHIBIT 6
DATE: MAY 2025	CONTRACT NO: XXXX-XX-XX	



CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTG UG & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING FOR STAKE OUT. THE CKL AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

REVIEWED BY

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No.	REVISION	DATE	BY	APPROVED
1	ISSUED FOR 60% REVIEW	MAY 2025	Y.Y.	M.B.
2	ISSUED FOR 90% REVIEW	FEB 0626	Y.Y.	M.B.

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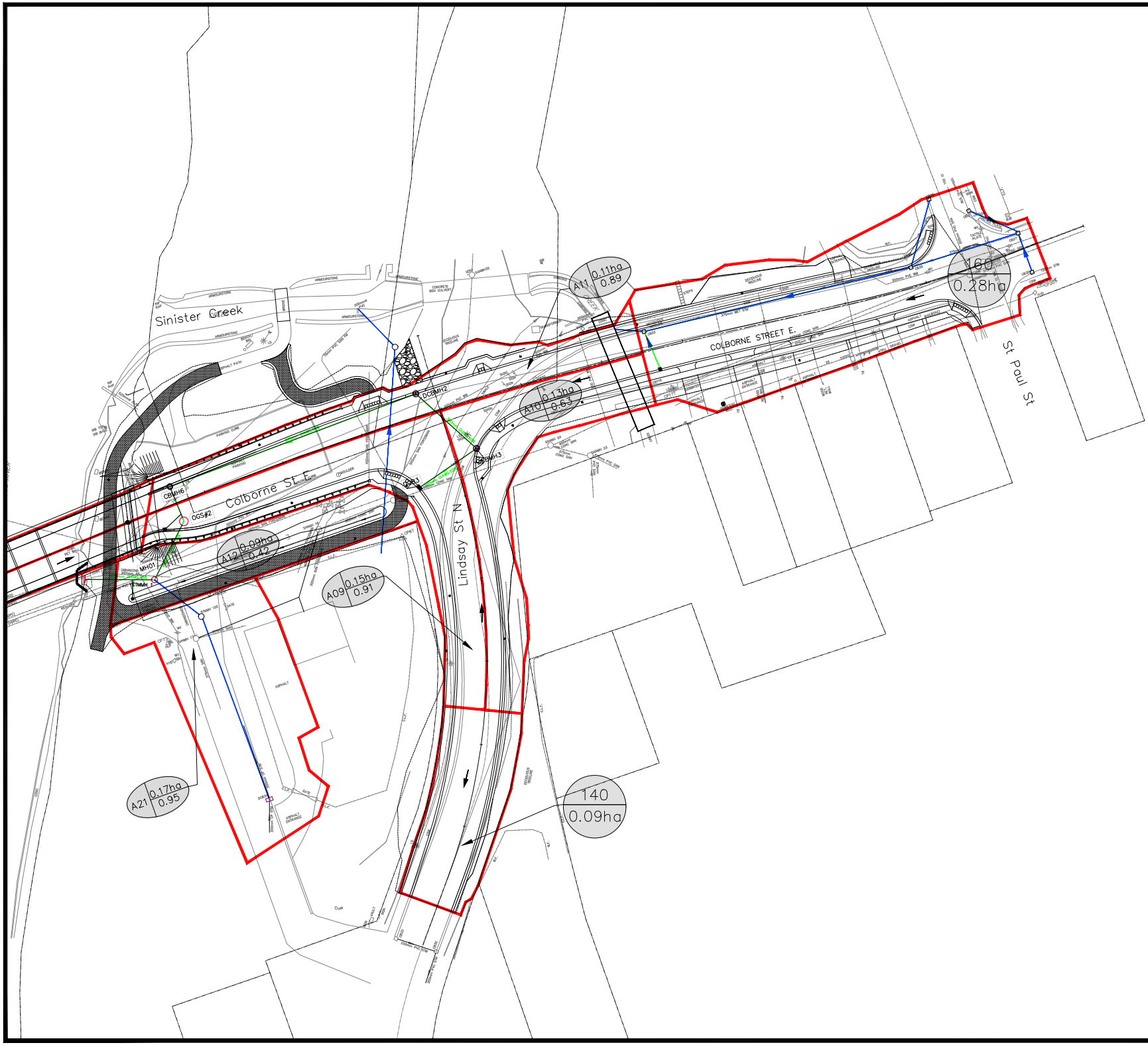
COLBOURNE STREET RECONSTRUCTION

PROPOSED SEWERSHED MOSAICS

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL: 1:500	DRAWING:
DRAWN BY: Y. YUAN	VERTICAL:	SHEET No: EXHIBIT 7
DATE: MAY 2025	CONTRACT NO: XXXX-XX-XX	



FLOW DIRECTION

PROP. STORM SEWER

EXISTING STORM SEWER

120 / 0.11ha — CATCHMENT ID / DRAINAGE AREA

CATCHMENT ID — A11 — 0.11ha — DRAINAGE AREA — 0.89 — COEFFICIENT

DRAINAGE BOUNDARY

N

CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTG UG & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING FOR STAKE OUT. THE CKL AND CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

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DATE:

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No.	REVISION	DATE	BY	APPROVED
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2	ISSUED FOR 90% REVIEW	FEB 0626	Y.Y.	M.B.

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COLBOURNE STREET RECONSTRUCTION

PROPOSED SEWERSHED MOSAICS

DESIGNED BY: Y. YUAN	SCALES	PROJECT No: B001592
CHECKED BY: M. BARAL	HORIZONTAL: 1:300	DRAWING:
DRAWN BY: Y. YUAN	VERTICAL:	SHEET No: EXHIBIT 8
DATE: MAY 2025	CONTRACT NO: XXXX-XX-XX	

B

Appendix B

Site Photographs

Photographic Inventory

Photo 1: Looking east from Colborne Street East

Photo 2: Lookin north from Colborne Street East / St. Paul Street Intersection

Photographic Inventory

Photo 3: Looking west from Colborne Street East.

Photo 4: Upstream of Box Culvert Crossing Colborne Street East

Photographic Inventory

Photo 5: Downstream of Box Culvert Crossing Colborne Street East

Photo 6: Looking West, Sinister Creek

Photographic Inventory

Photo 7: Sinister Creek confluence at Scugog River, looking west

Photo 8: View of Scugog River. Existing Storm Sewer oufall at the west riverbank

Photographic Inventory

Photo 9: Existing catch basin east of Culvert Crossing on Colborne Street East

Photo 10: Looking east from Colborne Street West/William Street North Intersection

Photo 11: Looking west from Colborne Street West

Photo 12: View of Scugog River, flow from south to north

C

Appendix C

Hydrologic Analysis

Hydrologic Modeling Parameters and Schematic

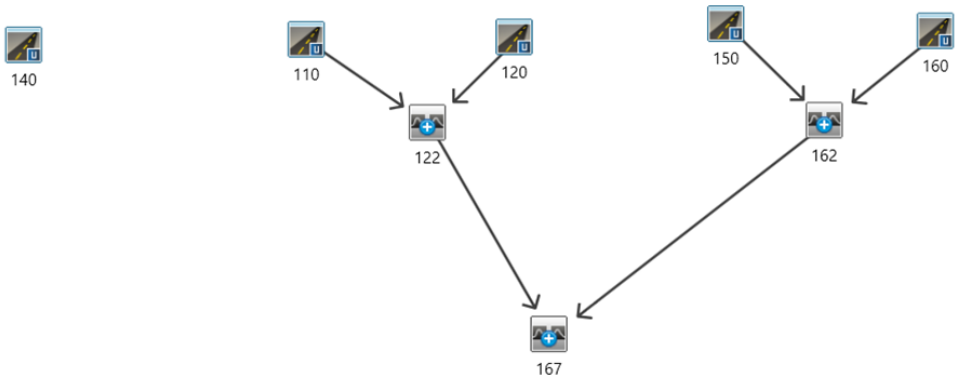
B001592_Kawartha Lakes_Colborne Street Detailed Design

Summary of Hydrologic Modelling Parameters

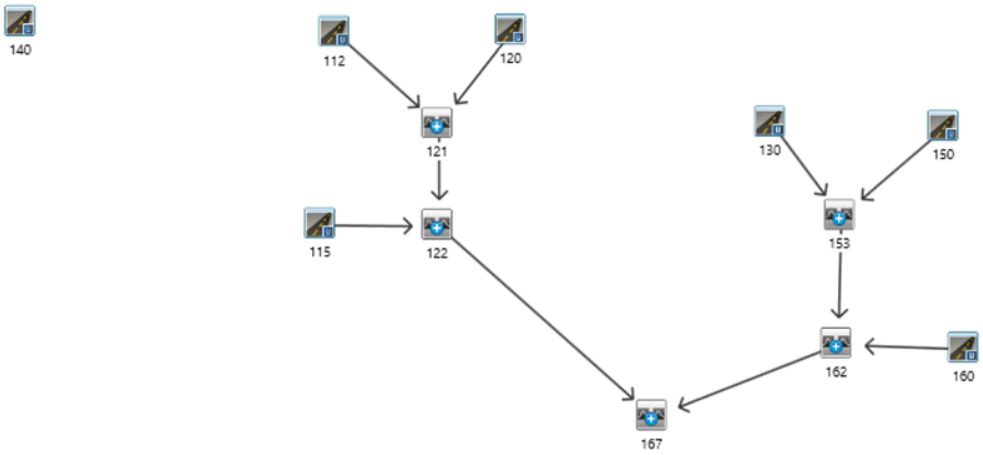
Sub-Catchment ID	IUH Class	Drainage Area (ha)	Imperviousness (%)					SCS Curve Number	Initial Abstraction (mm)		Manning's 'n'		Time to Peak (hours)	Number of Linear Reservoirs	Flow Length (m)		Slope (%)	
			Direct	+	Indirect	=	Total		Pervious	Impervious	Pervious	Impervious			Pervious	Impervious	Pervious	Impervious
Existing Conditions																		
110	Standard	0.71	36	+	0	=	36	71	5.00	2.0	0.25	0.013	n/a	n/a	40	69	2.0	1.0
120	Standard	0.11	77	+	0	=	77	71	5.00	2.0	0.25	0.013	n/a	n/a	40	27	2.0	1.0
140	Standard	0.11	76	+	0	=	76	58	5.00	2.0	0.25	0.013	n/a	n/a	40	26	2.0	1.0
150	Standard	0.31	54	+	0	=	54	58	5.00	2.0	0.25	0.013	n/a	n/a	40	45	2.0	1.0
160	Standard	0.34	72	+	0	=	72	58	5.00	2.0	0.25	0.013	n/a	n/a	40	47	2.0	1.0
Proposed Conditions																		
112	Standard	0.32	58	+	0	=	58	71	5.00	2.0	0.25	0.013	n/a	n/a	40	46	2.0	1.0
115	Standard	0.33	30	+	0	=	30	71	5.00	2.0	0.25	0.013	n/a	n/a	40	47	2.0	1.0
120	Standard	0.17	95	+	0	=	95	71	5.00	2.0	0.25	0.013	n/a	n/a	40	34	2.0	1.0
130	Standard	0.13	99	+	0	=	99	71	5.00	2.0	0.25	0.013	n/a	n/a	40	29	2.0	1.0
140	Standard	0.09	76	+	0	=	76	58	5.00	2.0	0.25	0.013	n/a	n/a	40	24	2.0	1.0
150	Standard	0.38	80	+	0	=	80	58	5.00	2.0	0.25	0.013	n/a	n/a	40	51	2.0	1.0
160	Standard	0.28	68	+	0	=	68	58	5.00	2.0	0.25	0.013	n/a	n/a	40	43	2.0	1.0
Total/Ave		**3.26**	**60**	**+**	**0**	**=**	**60**	**65**	**5.00**									

Visual OTTHYMO Hydrologic Modelling Schematic

FOR EXISTING CONDITIONS



FOR PROPOSED CONDITIONS



B001592_Kawartha Lakes_Colborne Street Detailed Design

Summary of Hydrologic Analysis

Existing Conditions								
Catchment/ HYD ID	Chicago Area (ha)	Chicago 4-hour						Remark
		2 year	5 year	10 year	25 year	50 year	100 year	
140		**0.020**	**0.024**	**0.027**	**0.032**	**0.035**	**0.039**	
110		0.061	0.074	0.085	0.110	0.124	0.140	
120		0.020	0.025	0.028	0.033	0.036	0.040	
122		**0.081**	**0.098**	**0.113**	**0.142**	**0.160**	**0.180**	
150		0.040	0.048	0.056	0.065	0.073	0.081	
160		0.058	0.070	0.079	0.093	0.103	0.114	
162		**0.098**	**0.118**	**0.135**	**0.158**	**0.176**	**0.195**	
167		**0.179**	**0.216**	**0.248**	**0.300**	**0.336**	**0.375**	

Existing Conditions								
Catchment/ HYD ID	SCS Area (ha)	SCS 6-hour						Remark
		2 year	5 year	10 year	25 year	50 year	100 year	
140		**0.015**	**0.019**	**0.021**	**0.026**	**0.029**	**0.032**	
110		0.050	0.064	0.078	0.099	0.115	0.132	
120		0.016	0.019	0.022	0.027	0.030	0.034	
122		**0.065**	**0.083**	**0.100**	**0.126**	**0.146**	**0.166**	
150		0.031	0.039	0.045	0.055	0.063	0.071	
160		0.044	0.055	0.063	0.075	0.085	0.096	
162		**0.076**	**0.094**	**0.109**	**0.130**	**0.148**	**0.167**	
167		**0.141**	**0.177**	**0.209**	**0.256**	**0.294**	**0.333**	

B001592_Kawartha Lakes_Colborne Street Detailed Design

Summary of Hydrologic Analysis

Existing Conditions								
Catchment/ HYD ID	SCS	SCS 12-hour						Remark
		2 year	5 year	10 year	25 year	50 year	100 year	
140		**0.015**	**0.018**	**0.020**	**0.024**	**0.027**	**0.030**	
110		0.050	0.063	0.076	0.097	0.112	0.128	
120		0.015	0.018	0.021	0.025	0.029	0.032	
122		**0.065**	**0.082**	**0.098**	**0.122**	**0.141**	**0.159**	
150		0.029	0.038	0.044	0.052	0.060	0.067	
160		0.043	0.052	0.060	0.071	0.081	0.090	
162		**0.072**	**0.090**	**0.104**	**0.124**	**0.141**	**0.157**	
167		**0.137**	**0.172**	**0.201**	**0.245**	**0.281**	**0.316**	

Existing Conditions								
Catchment/ HYD ID	SCS	SCS 24-hour						Remark
		2 year	5 year	10 year	25 year	50 year	100 year	
140		**0.015**	**0.018**	**0.021**	**0.025**	**0.028**	**0.031**	
110		0.053	0.066	0.079	0.099	0.115	0.129	
120		0.016	0.019	0.022	0.026	0.029	0.032	
122		**0.069**	**0.085**	**0.101**	**0.125**	**0.144**	**0.161**	
150		0.033	0.039	0.045	0.053	0.062	0.069	
160		0.046	0.054	0.062	0.073	0.083	0.091	
162		**0.078**	**0.094**	**0.107**	**0.126**	**0.144**	**0.160**	
167		**0.147**	**0.178**	**0.208**	**0.251**	**0.288**	**0.321**	

B001592_Kawartha Lakes_Colborne Street Detailed Design

Summary of Hydrologic Analysis

Proposed Conditions								
Catchment/ HYD ID	Chicago Area (ha)	Chicago 4-hour						Remark
		2 year	5 year	10 year	25 year	50 year	100 year	
140		**0.016**	**0.020**	**0.022**	**0.026**	**0.029**	**0.032**	
120		0.038	0.045	0.051	0.059	0.065	0.072	
112		0.045	0.055	0.063	0.075	0.084	0.093	
121		0.083	0.101	0.115	0.134	0.149	0.165	
115		0.024	0.029	0.034	0.041	0.048	0.054	
122		**0.107**	**0.130**	**0.148**	**0.175**	**0.197**	**0.219**	
130		0.030	0.036	0.040	0.047	0.051	0.056	
150		0.072	0.086	0.097	0.113	0.125	0.138	
153		0.102	0.122	0.138	0.160	0.177	0.195	
160		0.045	0.055	0.062	0.072	0.081	0.089	
162		**0.147**	**0.177**	**0.200**	**0.232**	**0.258**	**0.284**	
167		**0.254**	**0.307**	**0.348**	**0.407**	**0.455**	**0.504**	

Hydrologic Modelling output

Existing Condition

Chicago 4 Hr Storm Distribution_Existing Condition

```
                        Chicago 4 hr_Exsting Conditions
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\62
9d3889-5957-4f91-b49e-5df106c163c0\sc
  Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\62
9d3889-5957-4f91-b49e-5df106c163c0\sc


DATE: 01-16-2026                          TIME: 04:28:19

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------
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  ************************************************
  ** SIMULATION : 4hr  Chicago 100yr            **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=2518.000
| Ptotal= 76.41 mm |                          B=  13.200
```

```
                        Chicago 4 hr_Exsting Conditions
--------------------                      C=   0.882
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    3.74 |  1.00   48.41 |  2.00   11.70 |  3.00    4.70
                0.17    4.47 |  1.17  157.29 |  2.17    9.45 |  3.17    4.26
                0.33    5.56 |  1.33   64.01 |  2.33    7.90 |  3.33    3.90
                0.50    7.32 |  1.50   32.88 |  2.50    6.77 |  3.50    3.59
                0.67   10.56 |  1.67   21.09 |  2.67    5.91 |  3.67    3.33
                0.83   18.10 |  1.83   15.17 |  2.83    5.24 |  3.83    3.10


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0120)|   Area    (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  77.00   Dir. Conn.(%)=  77.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      27.08        40.00
     Mannings n             =     0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.033    3.74 | 1.033   48.41 | 2.033   11.70 |  3.03    4.70
               0.067    3.74 | 1.067   48.41 | 2.067   11.70 |  3.07    4.70
               0.100    3.74 | 1.100   48.41 | 2.100   11.70 |  3.10    4.70
               0.133    3.74 | 1.133   48.41 | 2.133   11.70 |  3.13    4.70
               0.167    3.74 | 1.167   48.41 | 2.167   11.70 |  3.17    4.70
               0.200    4.47 | 1.200  157.29 | 2.200    9.45 |  3.20    4.26
               0.233    4.47 | 1.233  157.29 | 2.233    9.45 |  3.23    4.26
               0.267    4.47 | 1.267  157.29 | 2.267    9.45 |  3.27    4.26
               0.300    4.47 | 1.300  157.29 | 2.300    9.45 |  3.30    4.26
               0.333    4.47 | 1.333  157.29 | 2.333    9.45 |  3.33    4.26
               0.367    5.56 | 1.367   64.01 | 2.367    7.90 |  3.37    3.90
               0.400    5.56 | 1.400   64.01 | 2.400    7.90 |  3.40    3.90
               0.433    5.56 | 1.433   64.01 | 2.433    7.90 |  3.43    3.90
```

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                        Chicago 4 hr_Exsting Conditions
               0.467    5.56 | 1.467   64.01 | 2.467    7.90 |  3.47    3.90
               0.500    5.56 | 1.500   64.01 | 2.500    7.90 |  3.50    3.90
               0.533    7.32 | 1.533   32.88 | 2.533    6.77 |  3.53    3.59
               0.567    7.32 | 1.567   32.88 | 2.567    6.77 |  3.57    3.59
               0.600    7.32 | 1.600   32.88 | 2.600    6.77 |  3.60    3.59
               0.633    7.32 | 1.633   32.88 | 2.633    6.77 |  3.63    3.59
               0.667    7.32 | 1.667   32.88 | 2.667    6.77 |  3.67    3.59
               0.700   10.56 | 1.700   21.09 | 2.700    5.91 |  3.70    3.33
               0.733   10.56 | 1.733   21.09 | 2.733    5.91 |  3.73    3.33
               0.767   10.56 | 1.767   21.09 | 2.767    5.91 |  3.77    3.33
               0.800   10.56 | 1.800   21.09 | 2.800    5.91 |  3.80    3.33
               0.833   10.56 | 1.833   21.09 | 2.833    5.91 |  3.83    3.33
               0.867   18.10 | 1.867   15.17 | 2.867    5.24 |  3.87    3.10
               0.900   18.10 | 1.900   15.17 | 2.900    5.24 |  3.90    3.10
               0.933   18.10 | 1.933   15.17 | 2.933    5.24 |  3.93    3.10
               0.967   18.10 | 1.967   15.17 | 2.967    5.24 |  3.97    3.10
               1.000   18.10 | 2.000   15.17 | 3.000    5.24 |  4.00    3.10

     Max.Eff.Inten.(mm/hr)=     157.29        53.22
               over (min)        5.00         6.00
     Storage Coeff.  (min)=      0.97 (ii)    4.60 (ii)
     Unit Hyd. Tpeak (min)=      4.00         6.00
     Unit Hyd. peak  (cms)=      0.52         0.22
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.04         0.00          0.040 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.37           1.33
     RUNOFF VOLUME    (mm)=     74.41        29.11          63.97
     TOTAL RAINFALL   (mm)=     76.41        76.41          76.41
     RUNOFF COEFFICIENT   =      0.97         0.38           0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  71.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0110)|   Area    (ha)=   0.71
|ID= 1 DT= 2.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  36.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.26         0.45
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      68.80        40.00
```

```
                        Chicago 4 hr_Exsting Conditions
     Mannings n             =     0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.033    3.74 | 1.033   48.41 | 2.033   11.70 |  3.03    4.70
               0.067    3.74 | 1.067   48.41 | 2.067   11.70 |  3.07    4.70
               0.100    3.74 | 1.100   48.41 | 2.100   11.70 |  3.10    4.70
               0.133    3.74 | 1.133   48.41 | 2.133   11.70 |  3.13    4.70
               0.167    3.74 | 1.167   48.41 | 2.167   11.70 |  3.17    4.70
               0.200    4.47 | 1.200  157.29 | 2.200    9.45 |  3.20    4.26
               0.233    4.47 | 1.233  157.29 | 2.233    9.45 |  3.23    4.26
               0.267    4.47 | 1.267  157.29 | 2.267    9.45 |  3.27    4.26
               0.300    4.47 | 1.300  157.29 | 2.300    9.45 |  3.30    4.26
               0.333    4.47 | 1.333  157.29 | 2.333    9.45 |  3.33    4.26
               0.367    5.56 | 1.367   64.01 | 2.367    7.90 |  3.37    3.90
               0.400    5.56 | 1.400   64.01 | 2.400    7.90 |  3.40    3.90
               0.433    5.56 | 1.433   64.01 | 2.433    7.90 |  3.43    3.90
               0.467    5.56 | 1.467   64.01 | 2.467    7.90 |  3.47    3.90
               0.500    5.56 | 1.500   64.01 | 2.500    7.90 |  3.50    3.90
               0.533    7.32 | 1.533   32.88 | 2.533    6.77 |  3.53    3.59
               0.567    7.32 | 1.567   32.88 | 2.567    6.77 |  3.57    3.59
               0.600    7.32 | 1.600   32.88 | 2.600    6.77 |  3.60    3.59
               0.633    7.32 | 1.633   32.88 | 2.633    6.77 |  3.63    3.59
               0.667    7.32 | 1.667   32.88 | 2.667    6.77 |  3.67    3.59
               0.700   10.56 | 1.700   21.09 | 2.700    5.91 |  3.70    3.33
               0.733   10.56 | 1.733   21.09 | 2.733    5.91 |  3.73    3.33
               0.767   10.56 | 1.767   21.09 | 2.767    5.91 |  3.77    3.33
               0.800   10.56 | 1.800   21.09 | 2.800    5.91 |  3.80    3.33
               0.833   10.56 | 1.833   21.09 | 2.833    5.91 |  3.83    3.33
               0.867   18.10 | 1.867   15.17 | 2.867    5.24 |  3.87    3.10
               0.900   18.10 | 1.900   15.17 | 2.900    5.24 |  3.90    3.10
               0.933   18.10 | 1.933   15.17 | 2.933    5.24 |  3.93    3.10
               0.967   18.10 | 1.967   15.17 | 2.967    5.24 |  3.97    3.10
               1.000   18.10 | 2.000   15.17 | 3.000    5.24 |  4.00    3.10

     Max.Eff.Inten.(mm/hr)=     157.29        53.22
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      1.70 (ii)    9.12 (ii)
     Unit Hyd. Tpeak (min)=      4.00        10.00
     Unit Hyd. peak  (cms)=      0.44         0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.11         0.05          0.140 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.47           1.33
     RUNOFF VOLUME    (mm)=     74.41        29.11          45.41
     TOTAL RAINFALL   (mm)=     76.41        76.41          76.41
```

RUNOFF COEFFICIENT = 0.97 0.38 0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.140	1.33	45.41
+ ID2= 2 (0120):		0.11	0.040	1.33	63.97
ID = 3 (0122):		0.82	0.180	1.33	47.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)= 0.31		
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00	Dir. Conn.(%)= 54.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26

0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Max.Eff.Inten.(mm/hr)=		157.29	34.28	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.33 (ii)	6.85 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.48	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.07	0.01	0.081 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	74.41	19.97	49.35
TOTAL RAINFALL	(mm)=	76.41	76.41	76.41
RUNOFF COEFFICIENT	=	0.97	0.26	0.65

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)= 0.34		
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00	Dir. Conn.(%)= 72.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Max.Eff.Inten.(mm/hr)=		157.29	34.28	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.37 (ii)	5.40 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.47	0.20	

				TOTALS
PEAK FLOW	(cms)=	0.11	0.01	0.114 (iii)
TIME TO PEAK	(hrs)=	1.33	1.40	1.33
RUNOFF VOLUME	(mm)=	74.41	19.97	59.16
TOTAL RAINFALL	(mm)=	76.41	76.41	76.41
RUNOFF COEFFICIENT	=	0.97	0.26	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):		0.31	0.081	1.33	49.35
+ ID2= 2 (0160):		0.34	0.114	1.33	59.16
ID = 3 (0162):		0.65	0.195	1.33	54.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):		0.82	0.180	1.33	47.90
+ ID2= 2 (0162):		0.65	0.195	1.33	54.48
ID = 3 (0167):		1.47	0.375	1.33	50.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)= 0.11		
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00

Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Max.Eff.Inten.(mm/hr)=		157.29	34.28	
over (min)		5.00	6.00	
Storage Coeff. (min)=		0.97 (ii)	4.69 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.52	0.22	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.00	0.039 (iii)
TIME TO PEAK	(hrs)=	1.33	1.40	1.33
RUNOFF VOLUME	(mm)=	74.41	19.97	61.32

TOTAL RAINFALL	(mm)=	76.41	76.41 76.41
RUNOFF COEFFICIENT	=	0.97	0.26 0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

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V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
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Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\1180c571-a317-4f26-a629-d20242679d58\sc

DATE: 01-16-2026 TIME: 04:28:19

USER:

COMMENTS: _____

****
** SIMULATION : 4hr Chicago 2yr **
****

CHICAGO STORM	Ptotal= 37.06 mm

IDF curve parameters: A= 858.000
B= 6.800
C= 0.822
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.15	1.00	20.33	2.00	5.50	3.00	2.59
0.17	2.49	1.17	84.39	2.17	4.60	3.17	2.39
0.33	2.98	1.33	26.99	2.33	3.97	3.33	2.23
0.50	3.73	1.50	13.71	2.50	3.49	3.50	2.08
0.67	5.04	1.67	9.12	2.67	3.13	3.67	1.95
0.83	7.98	1.83	6.85	2.83	2.83	3.83	1.84

CALIB	STANDHYD (0120)	ID= 1 DT= 2.0 min

Area (ha)= 0.11
Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=		84.39	13.49	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.25 (ii)	5.91 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.48	0.19	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.020 (iii)
TIME TO PEAK	(hrs)=	1.33	1.40	1.33
RUNOFF VOLUME	(mm)=	35.06	7.57	28.72
TOTAL RAINFALL	(mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT	=	0.95	0.20	0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95

0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=		84.39	10.95	
over (min)		5.00	20.00	
Storage Coeff. (min)=		2.18 (ii)	19.28 (ii)	
Unit Hyd. Tpeak (min)=		4.00	20.00	
Unit Hyd. peak (cms)=		0.39	0.06	
				TOTALS
PEAK FLOW	(cms)=	0.06	0.01	0.061 (iii)
TIME TO PEAK	(hrs)=	1.33	1.67	1.33
RUNOFF VOLUME	(mm)=	35.06	7.57	17.45
TOTAL RAINFALL	(mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT	=	0.95	0.20	0.47

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0110):	0.71	0.061	1.33	17.45
+ ID2= 2 (0120):	0.11	0.020	1.33	28.72
ID = 3 (0122):	0.82	0.081	1.33	18.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00

Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=		84.39	8.16	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.70 (ii)	8.79 (ii)	
Unit Hyd. Tpeak (min)=		4.00	10.00	
Unit Hyd. peak (cms)=		0.44	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.00	0.040 (iii)
TIME TO PEAK	(hrs)=	1.33	1.47	1.33
RUNOFF VOLUME	(mm)=	35.06	4.76	21.10
TOTAL RAINFALL	(mm)=	37.06	37.06	37.06

RUNOFF COEFFICIENT	=	0.95	0.13	0.57

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08

0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=		84.39	8.16	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.75 (ii)	6.93 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.43	0.15	
			TOTALS	
PEAK FLOW	(cms)=	0.06	0.00	0.058 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	35.06	4.76	26.57
TOTAL RAINFALL	(mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT	=	0.95	0.13	0.72

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):		0.31	0.040	1.33	21.10
+ ID2= 2 (0160):		0.34	0.058	1.33	26.57
ID = 3 (0162):		0.65	0.098	1.33	23.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)

0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=		84.39	8.16	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.25 (ii)	6.01 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.48	0.17	
			TOTALS	
PEAK FLOW	(cms)=	0.02	0.00	0.020 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	35.06	4.76	27.77
TOTAL RAINFALL	(mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT	=	0.95	0.13	0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

V V I SSSSS U U A L (v 6.2.2020)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

Developed and Distributed by Smart City Water Inc

***** D E T A I L E D O U T P U T *****

ID1= 1 (0122):		0.82	0.081	1.33	18.96
+ ID2= 2 (0162):		0.65	0.098	1.33	23.96
ID = 3 (0167):		1.47	0.179	1.33	21.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0140)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\9250c6e1-db35-4386-878d-b939402c4663\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\9250c6e1-db35-4386-878d-b939402c4663\sc

DATE: 01-16-2026 TIME: 04:28:19

USER:

COMMENTS: _____

** SIMULATION : 4hr Chicago 5yr **

CHICAGO STORM	IDF curve parameters:	A=1214.000
Ptotal= 45.35 mm		B= 9.000
		C= 0.847
	used in:	INTENSITY = A / (t + B)^C
	Duration of storm	= 4.00 hrs
	Storm time step	= 10.00 min
	Time to peak ratio	= 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	2.43	1.00	26.49	2.00	6.72	3.00	2.98
0.17	2.85	1.17	100.26	2.17	5.55	3.17	2.73
0.33	3.46	1.33	35.24	2.33	4.72	3.33	2.53
0.50	4.41	1.50	17.77	2.50	4.12	3.50	2.35
0.67	6.13	1.67	11.59	2.67	3.65	3.67	2.20
0.83	10.04	1.83	8.52	2.83	3.28	3.83	2.06

CALIB	
STANDHYD (0120)	Area (ha)= 0.11

Chicago 4 hr_Exsting Conditions

|ID= 1 DT= 2.0 min | Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=		100.26	20.31
over (min)		5.00	6.00
Storage Coeff. (min)=		1.17 (ii)	5.51 (ii)
Unit Hyd. Tpeak (min)=		4.00	6.00
Unit Hyd. peak (cms)=		0.49	0.20
			TOTALS
PEAK FLOW	(cms)=	0.02	0.00 0.025 (iii)
TIME TO PEAK	(hrs)=	1.33	1.40 1.33
RUNOFF VOLUME	(mm)=	43.35	11.30 35.96
TOTAL RAINFALL	(mm)=	45.35	45.35 45.35
RUNOFF COEFFICIENT	=	0.96	0.25 0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53

Chicago 4 hr_Exsting Conditions

0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=		100.26	17.18
over (min)		5.00	18.00
Storage Coeff. (min)=		2.04 (ii)	16.32 (ii)
Unit Hyd. Tpeak (min)=		4.00	18.00
Unit Hyd. peak (cms)=		0.40	0.07
			TOTALS
PEAK FLOW	(cms)=	0.07	0.01 0.074 (iii)
TIME TO PEAK	(hrs)=	1.33	1.60 1.33
RUNOFF VOLUME	(mm)=	43.35	11.30 22.82
TOTAL RAINFALL	(mm)=	45.35	45.35 45.35
RUNOFF COEFFICIENT	=	0.96	0.25 0.50

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0110):	0.71	0.074	1.33	22.82
+ ID2= 2 (0120):	0.11	0.025	1.33	35.96
ID = 3 (0122):	0.82	0.098	1.33	24.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Chicago 4 hr_Exsting Conditions

CALIB	
STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

```
     Max.Eff.Inten.(mm/hr)=     100.26        12.50
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.59 (ii)    8.20 (ii)
     Unit Hyd. Tpeak (min)=       4.00        10.00
     Unit Hyd. peak  (cms)=       0.45         0.13
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.00          0.048 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.47           1.33
     RUNOFF VOLUME    (mm)=      43.35         7.26          26.73
     TOTAL RAINFALL   (mm)=      45.35        45.35          45.35
     RUNOFF COEFFICIENT   =       0.96         0.16           0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0160)|   Area    (ha)=   0.34
|ID= 1 DT= 2.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.24         0.10
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      47.61        40.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.033    2.43 | 1.033   26.49 | 2.033    6.72 |  3.03    2.98
               0.067    2.43 | 1.067   26.49 | 2.067    6.72 |  3.07    2.98
               0.100    2.43 | 1.100   26.49 | 2.100    6.72 |  3.10    2.98
               0.133    2.43 | 1.133   26.49 | 2.133    6.72 |  3.13    2.98
               0.167    2.43 | 1.167   26.49 | 2.167    6.72 |  3.17    2.98
               0.200    2.85 | 1.200  100.26 | 2.200    5.55 |  3.20    2.73
               0.233    2.85 | 1.233  100.26 | 2.233    5.55 |  3.23    2.73
               0.267    2.85 | 1.267  100.26 | 2.267    5.55 |  3.27    2.73
               0.300    2.85 | 1.300  100.26 | 2.300    5.55 |  3.30    2.73
```



```
               0.333    2.85 | 1.333  100.26 | 2.333    5.55 |  3.33    2.73
               0.367    3.46 | 1.367   35.24 | 2.367    4.72 |  3.37    2.53
               0.400    3.46 | 1.400   35.24 | 2.400    4.72 |  3.40    2.53
               0.433    3.46 | 1.433   35.24 | 2.433    4.72 |  3.43    2.53
               0.467    3.46 | 1.467   35.24 | 2.467    4.72 |  3.47    2.53
               0.500    3.46 | 1.500   35.24 | 2.500    4.72 |  3.50    2.53
               0.533    4.41 | 1.533   17.77 | 2.533    4.12 |  3.53    2.35
               0.567    4.41 | 1.567   17.77 | 2.567    4.12 |  3.57    2.35
               0.600    4.41 | 1.600   17.77 | 2.600    4.12 |  3.60    2.35
               0.633    4.41 | 1.633   17.77 | 2.633    4.12 |  3.63    2.35
               0.667    4.41 | 1.667   17.77 | 2.667    4.12 |  3.67    2.35
               0.700    6.13 | 1.700   11.59 | 2.700    3.65 |  3.70    2.20
               0.733    6.13 | 1.733   11.59 | 2.733    3.65 |  3.73    2.20
               0.767    6.13 | 1.767   11.59 | 2.767    3.65 |  3.77    2.20
               0.800    6.13 | 1.800   11.59 | 2.800    3.65 |  3.80    2.20
               0.833    6.13 | 1.833   11.59 | 2.833    3.65 |  3.83    2.20
               0.867   10.04 | 1.867    8.52 | 2.867    3.28 |  3.87    2.06
               0.900   10.04 | 1.900    8.52 | 2.900    3.28 |  3.90    2.06
               0.933   10.04 | 1.933    8.52 | 2.933    3.28 |  3.93    2.06
               0.967   10.04 | 1.967    8.52 | 2.967    3.28 |  3.97    2.06
               1.000   10.04 | 2.000    8.52 | 3.000    3.28 |  4.00    2.06

     Max.Eff.Inten.(mm/hr)=     100.26        12.50
               over (min)        5.00         8.00
     Storage Coeff.  (min)=       1.63 (ii)    6.47 (ii)
     Unit Hyd. Tpeak (min)=       4.00         8.00
     Unit Hyd. peak  (cms)=       0.44         0.16
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.07         0.00          0.070 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.43           1.33
     RUNOFF VOLUME    (mm)=      43.35         7.26          33.23
     TOTAL RAINFALL   (mm)=      45.35        45.35          45.35
     RUNOFF COEFFICIENT   =       0.96         0.16           0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0162)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0150):     0.31   0.048     1.33    26.73
```



```
      + ID2= 2 (  0160):     0.34   0.070     1.33    33.23
        ================================================
        ID = 3 (  0162):     0.65   0.118     1.33    30.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0167)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0122):     0.82   0.098     1.33    24.59
      + ID2= 2 (  0162):     0.65   0.118     1.33    30.13
        ================================================
        ID = 3 (  0167):     1.47   0.216     1.33    27.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0140)|   Area    (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      27.08        40.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.033    2.43 | 1.033   26.49 | 2.033    6.72 |  3.03    2.98
               0.067    2.43 | 1.067   26.49 | 2.067    6.72 |  3.07    2.98
               0.100    2.43 | 1.100   26.49 | 2.100    6.72 |  3.10    2.98
               0.133    2.43 | 1.133   26.49 | 2.133    6.72 |  3.13    2.98
               0.167    2.43 | 1.167   26.49 | 2.167    6.72 |  3.17    2.98
               0.200    2.85 | 1.200  100.26 | 2.200    5.55 |  3.20    2.73
               0.233    2.85 | 1.233  100.26 | 2.233    5.55 |  3.23    2.73
               0.267    2.85 | 1.267  100.26 | 2.267    5.55 |  3.27    2.73
               0.300    2.85 | 1.300  100.26 | 2.300    5.55 |  3.30    2.73
               0.333    2.85 | 1.333  100.26 | 2.333    5.55 |  3.33    2.73
               0.367    3.46 | 1.367   35.24 | 2.367    4.72 |  3.37    2.53
               0.400    3.46 | 1.400   35.24 | 2.400    4.72 |  3.40    2.53
               0.433    3.46 | 1.433   35.24 | 2.433    4.72 |  3.43    2.53
```



```
               0.467    3.46 | 1.467   35.24 | 2.467    4.72 |  3.47    2.53
               0.500    3.46 | 1.500   35.24 | 2.500    4.72 |  3.50    2.53
               0.533    4.41 | 1.533   17.77 | 2.533    4.12 |  3.53    2.35
               0.567    4.41 | 1.567   17.77 | 2.567    4.12 |  3.57    2.35
               0.600    4.41 | 1.600   17.77 | 2.600    4.12 |  3.60    2.35
               0.633    4.41 | 1.633   17.77 | 2.633    4.12 |  3.63    2.35
               0.667    4.41 | 1.667   17.77 | 2.667    4.12 |  3.67    2.35
               0.700    6.13 | 1.700   11.59 | 2.700    3.65 |  3.70    2.20
               0.733    6.13 | 1.733   11.59 | 2.733    3.65 |  3.73    2.20
               0.767    6.13 | 1.767   11.59 | 2.767    3.65 |  3.77    2.20
               0.800    6.13 | 1.800   11.59 | 2.800    3.65 |  3.80    2.20
               0.833    6.13 | 1.833   11.59 | 2.833    3.65 |  3.83    2.20
               0.867   10.04 | 1.867    8.52 | 2.867    3.28 |  3.87    2.06
               0.900   10.04 | 1.900    8.52 | 2.900    3.28 |  3.90    2.06
               0.933   10.04 | 1.933    8.52 | 2.933    3.28 |  3.93    2.06
               0.967   10.04 | 1.967    8.52 | 2.967    3.28 |  3.97    2.06
               1.000   10.04 | 2.000    8.52 | 3.000    3.28 |  4.00    2.06

     Max.Eff.Inten.(mm/hr)=     100.26        12.50
               over (min)        5.00         6.00
     Storage Coeff.  (min)=       1.17 (ii)    5.61 (ii)
     Unit Hyd. Tpeak (min)=       4.00         6.00
     Unit Hyd. peak  (cms)=       0.49         0.20
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.024 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.40           1.33
     RUNOFF VOLUME    (mm)=      43.35         7.26          34.66
     TOTAL RAINFALL   (mm)=      45.35        45.35          45.35
     RUNOFF COEFFICIENT   =       0.96         0.16           0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
```

```
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O
        OOO     T      T    H   H    Y    M  M   OOO
Developed and Distributed by Smart City Water Inc
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0bcdc035-c270-4bba-9e3e-7f8587715bec\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0bcdc035-c270-4bba-9e3e-7f8587715bec\sc

DATE: 01-16-2026 TIME: 04:28:19

USER:

COMMENTS: _____

** SIMULATION : 4hr Chicago 10yr **

| CHICAGO STORM | IDF curve parameters: A=1487.000
| Ptotal= 52.06 mm | B= 10.200
C= 0.858

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.71	1.00	31.26	2.00	7.77	3.00	3.34
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=	112.80	26.47	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.11 (ii)	5.26 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.028 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	50.06	14.69	41.91
TOTAL RAINFALL (mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT =	0.96	0.28	0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (0110)| Area (ha)= 0.71
|ID= 1 DT= 2.0 min | Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.26	0.45
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	68.80	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=	112.80	23.30	
over (min)	5.00	16.00	
Storage Coeff. (min)=	1.95 (ii)	14.58 (ii)	
Unit Hyd. Tpeak (min)=	4.00	16.00	
Unit Hyd. peak (cms)=	0.41	0.08	
			TOTALS
PEAK FLOW (cms)=	0.08	0.02	0.085 (iii)
TIME TO PEAK (hrs)=	1.33	1.57	1.33
RUNOFF VOLUME (mm)=	50.06	14.69	27.41
TOTAL RAINFALL (mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT =	0.96	0.28	0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.085	1.33	27.41
+ ID2= 2 (0120):		0.11	0.028	1.33	41.91
ID = 3 (0122):		0.82	0.113	1.33	29.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)=	0.31	
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61

0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=		112.80	16.48	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.52 (ii)	7.82 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.46	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.00	0.056 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	50.06	9.59	31.43
TOTAL RAINFALL	(mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT	=	0.96	0.18	0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)=	0.34	
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=		112.80	16.48	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.56 (ii)	6.17 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.45	0.17	
				TOTALS
PEAK FLOW	(cms)=	0.08	0.00	0.079 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	50.06	9.59	38.72
TOTAL RAINFALL	(mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT	=	0.96	0.18	0.74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):		0.31	0.056	1.33	31.43
+ ID2= 2 (0160):		0.34	0.079	1.33	38.72
ID = 3 (0162):		0.65	0.135	1.33	35.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):		0.82	0.113	1.33	29.35
+ ID2= 2 (0162):		0.65	0.135	1.33	35.24
ID = 3 (0167):		1.47	0.248	1.33	31.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)=	0.11	
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34

0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=	112.80	16.48	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.11 (ii)	5.35 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.027 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	50.06	9.59	40.33
TOTAL RAINFALL (mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT =	0.96	0.18	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.


```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\75329aef-e3bf-4049-af31-584b1c7e33fd\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\75329aef-e3bf-4049-af31-584b1c7e33fd\sc

DATE: 01-16-2026 TIME: 04:28:19

USER:

COMMENTS: _____

****
** SIMULATION : 4hr Chicago 25yr **
****

CHICAGO STORM	IDF curve parameters: A=1898.000
Ptotal= 61.52 mm	B= 11.700
	C= 0.871

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.09	1.00	38.05	2.00	9.28	3.00	3.85
0.17	3.67	1.17	130.09	2.17	7.55	3.17	3.50
0.33	4.53	1.33	50.47	2.33	6.34	3.33	3.22
0.50	5.90	1.50	25.68	2.50	5.46	3.50	2.97
0.67	8.40	1.67	16.52	2.67	4.80	3.67	2.76
0.83	14.22	1.83	11.95	2.83	4.27	3.83	2.58

CALIB	
STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22

0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=	130.09	36.14	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.05 (ii)	4.97 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.51	0.21	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.033 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	59.52	19.94	50.40
TOTAL RAINFALL (mm)=	61.52	61.52	61.52
RUNOFF COEFFICIENT =	0.97	0.32	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00

Chicago 4 hr_Exsting Conditions

Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=		130.09	36.14	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.84 (ii)	9.83 (ii)	
Unit Hyd. Tpeak (min)=		4.00	10.00	
Unit Hyd. peak (cms)=		0.42	0.11	
				TOTALS
PEAK FLOW	(cms)=	0.09	0.03	0.110 (iii)
TIME TO PEAK	(hrs)=	1.33	1.47	1.33

Chicago 4 hr_Exsting Conditions

RUNOFF VOLUME	(mm)=	59.52	19.94	34.18
TOTAL RAINFALL	(mm)=	61.52	61.52	61.52
RUNOFF COEFFICIENT	=	0.97	0.32	0.56

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0110):	0.71	0.110	1.33	34.18
+	ID2= 2 (0120):	0.11	0.033	1.33	50.40
=	ID = 3 (0122):	0.82	0.142	1.33	36.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)=	0.31	
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50

Chicago 4 hr_Exsting Conditions

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=		130.09	22.74	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.43 (ii)	7.39 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.46	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.06	0.01	0.065 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	59.52	13.29	38.24
TOTAL RAINFALL	(mm)=	61.52	61.52	61.52
RUNOFF COEFFICIENT	=	0.97	0.22	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0160)	Area (ha)=	0.34

Chicago 4 hr_Exsting Conditions

ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=		130.09	22.74
over (min)		5.00	6.00
Storage Coeff. (min)=		1.47 (ii)	5.83 (ii)

Chicago 4 hr_Exsting Conditions

Unit Hyd. Tpeak (min)=	4.00	6.00		
Unit Hyd. peak (cms)=	0.46	0.19		
			TOTALS	
PEAK FLOW (cms)=	0.09	0.01	0.093 (iii)	
TIME TO PEAK (hrs)=	1.33	1.40	1.33	
RUNOFF VOLUME (mm)=	59.52	13.29	46.57	
TOTAL RAINFALL (mm)=	61.52	61.52	61.52	
RUNOFF COEFFICIENT =	0.97	0.22	0.76	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):		0.31	0.065	1.33	38.24
+ ID2= 2 (0160):		0.34	0.093	1.33	46.57
ID = 3 (0162):		0.65	0.158	1.33	42.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):		0.82	0.142	1.33	36.36
+ ID2= 2 (0162):		0.65	0.158	1.33	42.60
ID = 3 (0167):		1.47	0.300	1.33	39.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)=	0.11	
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)= 76.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.08	0.03

Chicago 4 hr_Exsting Conditions

Dep. Storage (mm)=	2.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	27.08	40.00	
Mannings n =	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=	130.09	22.74	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.05 (ii)	5.06 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.51	0.21	
		TOTALS	
PEAK FLOW (cms)=	0.03	0.00	0.032 (iii)

Chicago 4 hr_Exsting Conditions

TIME TO PEAK (hrs)=	1.33	1.40	1.33	
RUNOFF VOLUME (mm)=	59.52	13.29	48.41	
TOTAL RAINFALL (mm)=	61.52	61.52	61.52	
RUNOFF COEFFICIENT =	0.97	0.22	0.79	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

==========

V V I SSSSS U U A L (v 6.2.2020)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
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Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\fa718a2c-9b71-49e3-88f0-ca7eea26fbb1\sc

DATE: 01-16-2026 TIME: 04:28:19

USER:

Chicago 4 hr_Exsting Conditions

COMMENTS: _____

** SIMULATION : 4hr Chicago 50yr **

CHICAGO STORM	IDF curve parameters: A=2110.000
Ptotal= 68.70 mm	B= 12.000
	C= 0.870

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.49	1.00	42.63	2.00	10.48	3.00	4.35
0.17	4.15	1.17	143.34	2.17	8.52	3.17	3.96
0.33	5.11	1.33	56.43	2.33	7.17	3.33	3.63
0.50	6.66	1.50	28.88	2.50	6.17	3.50	3.36
0.67	9.49	1.67	18.62	2.67	5.42	3.67	3.12
0.83	16.03	1.83	13.49	2.83	4.82	3.83	2.92

CALIB			
STANDHYD (0120)	Area (ha)=	0.11	
ID= 1 DT= 2.0 min	Total Imp(%)=	77.00	Dir. Conn.(%)= 77.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.08	0.03
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	27.08	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=	143.34	44.15	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.01 (ii)	4.78 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.51	0.22	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.036 (iii)
TIME TO PEAK (hrs)=	1.33	1.37	1.33
RUNOFF VOLUME (mm)=	66.70	24.24	56.92
TOTAL RAINFALL (mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT =	0.97	0.35	0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92

0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=	143.34	44.15	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.77 (ii)	9.46 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.43	0.12	
			TOTALS
PEAK FLOW (cms)=	0.10	0.04	0.124 (iii)
TIME TO PEAK (hrs)=	1.33	1.47	1.33
RUNOFF VOLUME (mm)=	66.70	24.24	39.52
TOTAL RAINFALL (mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT =	0.97	0.35	0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.124	1.33	39.52
+ ID2= 2 (0120):		0.11	0.036	1.33	56.92
ID = 3 (0122):		0.82	0.160	1.33	41.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=	143.34	28.09	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.38 (ii)	7.11 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.15	
			TOTALS
PEAK FLOW (cms)=	0.07	0.01	0.073 (iii)
TIME TO PEAK (hrs)=	1.33	1.43	1.33
RUNOFF VOLUME (mm)=	66.70	16.39	43.54
TOTAL RAINFALL (mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT =	0.97	0.24	0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

				TOTALS
Max.Eff.Inten.(mm/hr)	=	143.34	28.09	
	over (min)	5.00	6.00	
Storage Coeff.	(min)=	1.42 (ii)	5.61 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	6.00	
Unit Hyd. peak	(cms)=	0.47	0.20	
PEAK FLOW	(cms)=	0.10	0.01	0.103 (iii)
TIME TO PEAK	(hrs)=	1.33	1.40	1.33
RUNOFF VOLUME	(mm)=	66.70	16.39	52.60
TOTAL RAINFALL	(mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT	=	0.97	0.24	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.073	1.33	43.54
+ ID2= 2 (0160):	0.34	0.103	1.33	52.60
ID = 3 (0162):	0.65	0.176	1.33	48.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.160	1.33	41.85
+ ID2= 2 (0162):	0.65	0.176	1.33	48.28
ID = 3 (0167):	1.47	0.336	1.33	44.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0140)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

				TOTALS
Max.Eff.Inten.(mm/hr)	=	143.34	28.09	
	over (min)	5.00	6.00	
Storage Coeff.	(min)=	1.01 (ii)	4.86 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	6.00	
Unit Hyd. peak	(cms)=	0.51	0.21	
PEAK FLOW	(cms)=	0.03	0.00	0.035 (iii)
TIME TO PEAK	(hrs)=	1.33	1.40	1.33
RUNOFF VOLUME	(mm)=	66.70	16.39	54.61
TOTAL RAINFALL	(mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT	=	0.97	0.24	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

SCS 6 Hr Storm Distribution_Existing Condition


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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\58
feaf20-5eec-43d0-8d0f-0758d5ee3481\sc
  Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\58
feaf20-5eec-43d0-8d0f-0758d5ee3481\sc


DATE: 01-16-2026                          TIME: 04:28:40

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 6hr SCS 100yr                 **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\Yuan.Yuan\AppD
```



```
|                  |              ata\Local\Temp\
|                  |              15a0ef31-42bd-44d7-a726-d69de60405b3\ea438787
| Ptotal= 81.42 mm |    Comments: 6hr SCS 100yr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	8.14	3.50	17.91	5.25	3.26
0.25	3.26	2.00	8.14	3.75	8.14	5.50	3.26
0.50	3.26	2.25	9.77	4.00	8.14	5.75	3.26
0.75	4.89	2.50	9.77	4.25	6.51	6.00	3.26
1.00	4.89	2.75	48.85	4.50	6.51		
1.25	4.89	3.00	127.02	4.75	4.89		
1.50	4.89	3.25	17.91	5.00	4.89		

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| CALIB            |
| STANDHYD (  0120)|   Area    (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  77.00   Dir. Conn.(%)=  77.00
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```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

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      NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.89	3.167	127.02	4.73	6.51
0.067	0.00	1.633	4.89	3.200	127.02	4.77	5.70
0.100	0.00	1.667	4.89	3.233	127.02	4.80	4.89
0.133	0.00	1.700	4.89	3.267	72.47	4.83	4.89
0.167	0.00	1.733	4.89	3.300	17.91	4.87	4.89
0.200	0.00	1.767	6.51	3.333	17.91	4.90	4.89
0.233	0.00	1.800	8.14	3.367	17.91	4.93	4.89
0.267	1.63	1.833	8.14	3.400	17.91	4.97	4.89
0.300	3.26	1.867	8.14	3.433	17.91	5.00	4.89
0.333	3.26	1.900	8.14	3.467	17.91	5.03	4.89
0.367	3.26	1.933	8.14	3.500	17.91	5.07	4.89
0.400	3.26	1.967	8.14	3.533	17.91	5.10	4.89
0.433	3.26	2.000	8.14	3.567	17.91	5.13	4.89
0.467	3.26	2.033	8.14	3.600	17.91	5.17	4.89
0.500	3.26	2.067	8.14	3.633	17.91	5.20	4.89

0.533	3.26	2.100	8.14	3.667	17.91	5.23	4.89
0.567	3.26	2.133	8.14	3.700	17.91	5.27	4.07
0.600	3.26	2.167	8.14	3.733	17.91	5.30	3.26
0.633	3.26	2.200	8.14	3.767	13.03	5.33	3.26
0.667	3.26	2.233	8.14	3.800	8.14	5.37	3.26
0.700	3.26	2.267	8.96	3.833	8.14	5.40	3.26
0.733	3.26	2.300	9.77	3.867	8.14	5.43	3.26
0.767	4.07	2.333	9.77	3.900	8.14	5.47	3.26
0.800	4.89	2.367	9.77	3.933	8.14	5.50	3.26
0.833	4.89	2.400	9.77	3.967	8.14	5.53	3.26
0.867	4.89	2.433	9.77	4.000	8.14	5.57	3.26
0.900	4.89	2.467	9.77	4.033	8.14	5.60	3.26
0.933	4.89	2.500	9.77	4.067	8.14	5.63	3.26
0.967	4.89	2.533	9.77	4.100	8.14	5.67	3.26
1.000	4.89	2.567	9.77	4.133	8.14	5.70	3.26
1.033	4.89	2.600	9.77	4.167	8.14	5.73	3.26
1.067	4.89	2.633	9.77	4.200	8.14	5.77	3.26
1.100	4.89	2.667	9.77	4.233	8.14	5.80	3.26
1.133	4.89	2.700	9.77	4.267	7.33	5.83	3.26
1.167	4.89	2.733	9.77	4.300	6.51	5.87	3.26
1.200	4.89	2.767	29.31	4.333	6.51	5.90	3.26
1.233	4.89	2.800	48.85	4.367	6.51	5.93	3.26
1.267	4.89	2.833	48.85	4.400	6.51	5.97	3.26
1.300	4.89	2.867	48.85	4.433	6.51	6.00	3.26
1.333	4.89	2.900	48.85	4.467	6.51	6.03	3.26
1.367	4.89	2.933	48.85	4.500	6.51	6.07	3.26
1.400	4.89	2.967	48.85	4.533	6.51	6.10	3.26
1.433	4.89	3.000	48.85	4.567	6.51	6.13	3.26
1.467	4.89	3.033	127.01	4.600	6.51	6.17	3.26
1.500	4.89	3.067	127.02	4.633	6.51	6.20	3.26
1.533	4.89	3.100	127.02	4.667	6.51	6.23	3.26
1.567	4.89	3.133	127.02	4.700	6.51	6.27	1.63

Max.Eff.Inten.(mm/hr)=	127.02	62.08	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.06 (ii)	5.02 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.51	0.21	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.034 (iii)
TIME TO PEAK (hrs)=	3.23	3.27	3.23
RUNOFF VOLUME (mm)=	79.42	32.41	68.59
TOTAL RAINFALL (mm)=	81.42	81.42	81.42
RUNOFF COEFFICIENT =	0.98	0.40	0.84

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***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  71.0    Ia = Dep. Storage  (Above)
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     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0110)|   Area    (ha)=   0.71
|ID= 1 DT= 2.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  36.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

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      NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.89	3.167	127.02	4.73	6.51
0.067	0.00	1.633	4.89	3.200	127.02	4.77	5.70
0.100	0.00	1.667	4.89	3.233	127.02	4.80	4.89
0.133	0.00	1.700	4.89	3.267	72.47	4.83	4.89
0.167	0.00	1.733	4.89	3.300	17.91	4.87	4.89
0.200	0.00	1.767	6.51	3.333	17.91	4.90	4.89
0.233	0.00	1.800	8.14	3.367	17.91	4.93	4.89
0.267	1.63	1.833	8.14	3.400	17.91	4.97	4.89
0.300	3.26	1.867	8.14	3.433	17.91	5.00	4.89
0.333	3.26	1.900	8.14	3.467	17.91	5.03	4.89
0.367	3.26	1.933	8.14	3.500	17.91	5.07	4.89
0.400	3.26	1.967	8.14	3.533	17.91	5.10	4.89
0.433	3.26	2.000	8.14	3.567	17.91	5.13	4.89
0.467	3.26	2.033	8.14	3.600	17.91	5.17	4.89
0.500	3.26	2.067	8.14	3.633	17.91	5.20	4.89
0.533	3.26	2.100	8.14	3.667	17.91	5.23	4.89
0.567	3.26	2.133	8.14	3.700	17.91	5.27	4.07
0.600	3.26	2.167	8.14	3.733	17.91	5.30	3.26
0.633	3.26	2.200	8.14	3.767	13.03	5.33	3.26
0.667	3.26	2.233	8.14	3.800	8.14	5.37	3.26
0.700	3.26	2.267	8.96	3.833	8.14	5.40	3.26
0.733	3.26	2.300	9.77	3.867	8.14	5.43	3.26
0.767	4.07	2.333	9.77	3.900	8.14	5.47	3.26
0.800	4.89	2.367	9.77	3.933	8.14	5.50	3.26
0.833	4.89	2.400	9.77	3.967	8.14	5.53	3.26
0.867	4.89	2.433	9.77	4.000	8.14	5.57	3.26

0.900	4.89	2.467	9.77	4.033	8.14	5.60	3.26
0.933	4.89	2.500	9.77	4.067	8.14	5.63	3.26
0.967	4.89	2.533	9.77	4.100	8.14	5.67	3.26
1.000	4.89	2.567	9.77	4.133	8.14	5.70	3.26
1.033	4.89	2.600	9.77	4.167	8.14	5.73	3.26
1.067	4.89	2.633	9.77	4.200	8.14	5.77	3.26
1.100	4.89	2.667	9.77	4.233	8.14	5.80	3.26
1.133	4.89	2.700	9.77	4.267	7.33	5.83	3.26
1.167	4.89	2.733	9.77	4.300	6.51	5.87	3.26
1.200	4.89	2.767	29.31	4.333	6.51	5.90	3.26
1.233	4.89	2.800	48.85	4.367	6.51	5.93	3.26
1.267	4.89	2.833	48.85	4.400	6.51	5.97	3.26
1.300	4.89	2.867	48.85	4.433	6.51	6.00	3.26
1.333	4.89	2.900	48.85	4.467	6.51	6.03	3.26
1.367	4.89	2.933	48.85	4.500	6.51	6.07	3.26
1.400	4.89	2.967	48.85	4.533	6.51	6.10	3.26
1.433	4.89	3.000	48.85	4.567	6.51	6.13	3.26
1.467	4.89	3.033	127.01	4.600	6.51	6.17	3.26
1.500	4.89	3.067	127.02	4.633	6.51	6.20	3.26
1.533	4.89	3.100	127.02	4.667	6.51	6.23	3.26
1.567	4.89	3.133	127.02	4.700	6.51	6.27	1.63

Max.Eff.Inten.(mm/hr)=		127.02	62.08	
over (min)		5.00	12.00	
Storage Coeff. (min)=		1.86 (ii)	10.40 (ii)	
Unit Hyd. Tpeak (min)=		4.00	12.00	
Unit Hyd. peak (cms)=		0.42	0.10	
				TOTALS
PEAK FLOW	(cms)=	0.09	0.05	0.132 (iii)
TIME TO PEAK	(hrs)=	3.23	3.33	3.23
RUNOFF VOLUME	(mm)=	79.42	32.41	49.33
TOTAL RAINFALL	(mm)=	81.42	81.42	81.42
RUNOFF COEFFICIENT	=	0.98	0.40	0.61

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):	0.71	0.132	3.23	49.33

0.867	4.89	2.433	9.77	4.000	8.14	5.57	3.26
0.900	4.89	2.467	9.77	4.033	8.14	5.60	3.26
0.933	4.89	2.500	9.77	4.067	8.14	5.63	3.26
0.967	4.89	2.533	9.77	4.100	8.14	5.67	3.26
1.000	4.89	2.567	9.77	4.133	8.14	5.70	3.26
1.033	4.89	2.600	9.77	4.167	8.14	5.73	3.26
1.067	4.89	2.633	9.77	4.200	8.14	5.77	3.26
1.100	4.89	2.667	9.77	4.233	8.14	5.80	3.26
1.133	4.89	2.700	9.77	4.267	7.33	5.83	3.26
1.167	4.89	2.733	9.77	4.300	6.51	5.87	3.26
1.200	4.89	2.767	29.31	4.333	6.51	5.90	3.26
1.233	4.89	2.800	48.85	4.367	6.51	5.93	3.26
1.267	4.89	2.833	48.85	4.400	6.51	5.97	3.26
1.300	4.89	2.867	48.85	4.433	6.51	6.00	3.26
1.333	4.89	2.900	48.85	4.467	6.51	6.03	3.26
1.367	4.89	2.933	48.85	4.500	6.51	6.07	3.26
1.400	4.89	2.967	48.85	4.533	6.51	6.10	3.26
1.433	4.89	3.000	48.85	4.567	6.51	6.13	3.26
1.467	4.89	3.033	127.01	4.600	6.51	6.17	3.26
1.500	4.89	3.067	127.02	4.633	6.51	6.20	3.26
1.533	4.89	3.100	127.02	4.667	6.51	6.23	3.26
1.567	4.89	3.133	127.02	4.700	6.51	6.27	1.63

Max.Eff.Inten.(mm/hr)=		127.02	42.45	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.45 (ii)	7.46 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.46	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.06	0.01	0.071 (iii)
TIME TO PEAK	(hrs)=	3.23	3.30	3.23
RUNOFF VOLUME	(mm)=	79.42	22.43	53.19
TOTAL RAINFALL	(mm)=	81.42	81.42	81.42
RUNOFF COEFFICIENT	=	0.98	0.28	0.65

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

+ ID2= 2 (0120):	0.11	0.034	3.23 68.59
ID = 3 (0122):	0.82	0.166	3.23 51.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	0.00	1.600	4.89	3.167	127.02	4.73	6.51
0.067	0.00	1.633	4.89	3.200	127.02	4.77	5.70
0.100	0.00	1.667	4.89	3.233	127.02	4.80	4.89
0.133	0.00	1.700	4.89	3.267	72.47	4.83	4.89
0.167	0.00	1.733	4.89	3.300	17.91	4.87	4.89
0.200	0.00	1.767	6.51	3.333	17.91	4.90	4.89
0.233	0.00	1.800	8.14	3.367	17.91	4.93	4.89
0.267	1.63	1.833	8.14	3.400	17.91	4.97	4.89
0.300	3.26	1.867	8.14	3.433	17.91	5.00	4.89
0.333	3.26	1.900	8.14	3.467	17.91	5.03	4.89
0.367	3.26	1.933	8.14	3.500	17.91	5.07	4.89
0.400	3.26	1.967	8.14	3.533	17.91	5.10	4.89
0.433	3.26	2.000	8.14	3.567	17.91	5.13	4.89
0.467	3.26	2.033	8.14	3.600	17.91	5.17	4.89
0.500	3.26	2.067	8.14	3.633	17.91	5.20	4.89
0.533	3.26	2.100	8.14	3.667	17.91	5.23	4.89
0.567	3.26	2.133	8.14	3.700	17.91	5.27	4.07
0.600	3.26	2.167	8.14	3.733	17.91	5.30	3.26
0.633	3.26	2.200	8.14	3.767	13.03	5.33	3.26
0.667	3.26	2.233	8.14	3.800	8.14	5.37	3.26
0.700	3.26	2.267	8.96	3.833	8.14	5.40	3.26
0.733	3.26	2.300	9.77	3.867	8.14	5.43	3.26
0.767	4.07	2.333	9.77	3.900	8.14	5.47	3.26
0.800	4.89	2.367	9.77	3.933	8.14	5.50	3.26
0.833	4.89	2.400	9.77	3.967	8.14	5.53	3.26

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	0.00	1.600	4.89	3.167	127.02	4.73	6.51
0.067	0.00	1.633	4.89	3.200	127.02	4.77	5.70
0.100	0.00	1.667	4.89	3.233	127.02	4.80	4.89
0.133	0.00	1.700	4.89	3.267	72.47	4.83	4.89
0.167	0.00	1.733	4.89	3.300	17.91	4.87	4.89
0.200	0.00	1.767	6.51	3.333	17.91	4.90	4.89
0.233	0.00	1.800	8.14	3.367	17.91	4.93	4.89
0.267	1.63	1.833	8.14	3.400	17.91	4.97	4.89
0.300	3.26	1.867	8.14	3.433	17.91	5.00	4.89
0.333	3.26	1.900	8.14	3.467	17.91	5.03	4.89
0.367	3.26	1.933	8.14	3.500	17.91	5.07	4.89
0.400	3.26	1.967	8.14	3.533	17.91	5.10	4.89
0.433	3.26	2.000	8.14	3.567	17.91	5.13	4.89
0.467	3.26	2.033	8.14	3.600	17.91	5.17	4.89
0.500	3.26	2.067	8.14	3.633	17.91	5.20	4.89
0.533	3.26	2.100	8.14	3.667	17.91	5.23	4.89
0.567	3.26	2.133	8.14	3.700	17.91	5.27	4.07
0.600	3.26	2.167	8.14	3.733	17.91	5.30	3.26
0.633	3.26	2.200	8.14	3.767	13.03	5.33	3.26
0.667	3.26	2.233	8.14	3.800	8.14	5.37	3.26
0.700	3.26	2.267	8.96	3.833	8.14	5.40	3.26
0.733	3.26	2.300	9.77	3.867	8.14	5.43	3.26
0.767	4.07	2.333	9.77	3.900	8.14	5.47	3.26
0.800	4.89	2.367	9.77	3.933	8.14	5.50	3.26
0.833	4.89	2.400	9.77	3.967	8.14	5.53	3.26
0.867	4.89	2.433	9.77	4.033	8.14	5.60	3.26
0.900	4.89	2.467	9.77	4.067	8.14	5.63	3.26
0.933	4.89	2.500	9.77	4.100	8.14	5.67	3.26
0.967	4.89	2.533	9.77	4.133	8.14	5.70	3.26
1.000	4.89	2.567	9.77	4.167	8.14	5.73	3.26
1.033	4.89	2.600	9.77	4.200	8.14	5.77	3.26
1.067	4.89	2.633	9.77	4.233	8.14	5.80	3.26
1.100	4.89	2.667	9.77	4.267	7.33	5.83	3.26
1.133	4.89	2.700	9.77	4.300	6.51	5.87	3.26
1.167	4.89	2.733	9.77	4.333	6.51	5.90	3.26
1.200	4.89	2.767	29.31	4.367	6.51	5.93	3.26

1.233	4.89	2.800	48.85	4.367	6.51	5.93	3.26
1.267	4.89	2.833	48.85	4.400	6.51	5.97	3.26
1.300	4.89	2.867	48.85	4.433	6.51	6.00	3.26
1.333	4.89	2.900	48.85	4.467	6.51	6.03	3.26
1.367	4.89	2.933	48.85	4.500	6.51	6.07	3.26
1.400	4.89	2.967	48.85	4.533	6.51	6.10	3.26
1.433	4.89	3.000	48.85	4.567	6.51	6.13	3.26
1.467	4.89	3.033	127.01	4.600	6.51	6.17	3.26
1.500	4.89	3.067	127.02	4.633	6.51	6.20	3.26
1.533	4.89	3.100	127.02	4.667	6.51	6.23	3.26
1.567	4.89	3.133	127.02	4.700	6.51	6.27	1.63

Max.Eff.Inten.(mm/hr)=	127.02	42.45	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.49 (ii)	5.88 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.46	0.19	
			TOTALS
PEAK FLOW (cms)=	0.09	0.01	0.096 (iii)
TIME TO PEAK (hrs)=	3.23	3.27	3.23
RUNOFF VOLUME (mm)=	79.42	22.43	63.45
TOTAL RAINFALL (mm)=	81.42	81.42	81.42
RUNOFF COEFFICIENT =	0.98	0.28	0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.071	3.23	53.19
+ ID2= 2 (0160):	0.34	0.096	3.23	63.45
ID = 3 (0162):	0.65	0.167	3.23	58.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	

0.800	4.89	2.367	9.77	3.933	8.14	5.50	3.26
0.833	4.89	2.400	9.77	3.967	8.14	5.53	3.26
0.867	4.89	2.433	9.77	4.000	8.14	5.57	3.26
0.900	4.89	2.467	9.77	4.033	8.14	5.60	3.26
0.933	4.89	2.500	9.77	4.067	8.14	5.63	3.26
0.967	4.89	2.533	9.77	4.100	8.14	5.67	3.26
1.000	4.89	2.567	9.77	4.133	8.14	5.70	3.26
1.033	4.89	2.600	9.77	4.167	8.14	5.73	3.26
1.067	4.89	2.633	9.77	4.200	8.14	5.77	3.26
1.100	4.89	2.667	9.77	4.233	8.14	5.80	3.26
1.133	4.89	2.700	9.77	4.267	7.33	5.83	3.26
1.167	4.89	2.733	9.77	4.300	6.51	5.87	3.26
1.200	4.89	2.767	29.31	4.333	6.51	5.90	3.26
1.233	4.89	2.800	48.85	4.367	6.51	5.93	3.26
1.267	4.89	2.833	48.85	4.400	6.51	5.97	3.26
1.300	4.89	2.867	48.85	4.433	6.51	6.00	3.26
1.333	4.89	2.900	48.85	4.467	6.51	6.03	3.26
1.367	4.89	2.933	48.85	4.500	6.51	6.07	3.26
1.400	4.89	2.967	48.85	4.533	6.51	6.10	3.26
1.433	4.89	3.000	48.85	4.567	6.51	6.13	3.26
1.467	4.89	3.033	127.01	4.600	6.51	6.17	3.26
1.500	4.89	3.067	127.02	4.633	6.51	6.20	3.26
1.533	4.89	3.100	127.02	4.667	6.51	6.23	3.26
1.567	4.89	3.133	127.02	4.700	6.51	6.27	1.63

Max.Eff.Inten.(mm/hr)=	127.02	42.45	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.06 (ii)	5.10 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.51	0.21	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.032 (iii)
TIME TO PEAK (hrs)=	3.23	3.27	3.23
RUNOFF VOLUME (mm)=	79.42	22.43	65.72
TOTAL RAINFALL (mm)=	81.42	81.42	81.42
RUNOFF COEFFICIENT =	0.98	0.28	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):	0.82	0.166	3.23	51.91
+ ID2= 2 (0162):	0.65	0.167	3.23	58.56
ID = 3 (0167):	1.47	0.333	3.23	54.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)= 0.11		
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.89	3.167	127.02	4.73	6.51
0.067	0.00	1.633	4.89	3.200	127.02	4.77	5.70
0.100	0.00	1.667	4.89	3.233	127.02	4.80	4.89
0.133	0.00	1.700	4.89	3.267	72.47	4.83	4.89
0.167	0.00	1.733	4.89	3.300	17.91	4.87	4.89
0.200	0.00	1.767	6.51	3.333	17.91	4.90	4.89
0.233	0.00	1.800	8.14	3.367	17.91	4.93	4.89
0.267	1.63	1.833	8.14	3.400	17.91	4.97	4.89
0.300	3.26	1.867	8.14	3.433	17.91	5.00	4.89
0.333	3.26	1.900	8.14	3.467	17.91	5.03	4.89
0.367	3.26	1.933	8.14	3.500	17.91	5.07	4.89
0.400	3.26	1.967	8.14	3.533	17.91	5.10	4.89
0.433	3.26	2.000	8.14	3.567	17.91	5.13	4.89
0.467	3.26	2.033	8.14	3.600	17.91	5.17	4.89
0.500	3.26	2.067	8.14	3.633	17.91	5.20	4.89
0.533	3.26	2.100	8.14	3.667	17.91	5.23	4.89
0.567	3.26	2.133	8.14	3.700	17.91	5.27	4.07
0.600	3.26	2.167	8.14	3.733	17.91	5.30	3.26
0.633	3.26	2.200	8.14	3.767	13.03	5.33	3.26
0.667	3.26	2.233	8.14	3.800	8.14	5.37	3.26
0.700	3.26	2.267	8.96	3.833	8.14	5.40	3.26
0.733	3.26	2.300	9.77	3.867	8.14	5.43	3.26
0.767	4.07	2.333	9.77	3.900	8.14	5.47	3.26


```
V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\877ca20f-db3a-4469-9118-63b88ca3b38d\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\877ca20f-db3a-4469-9118-63b88ca3b38d\sc

DATE: 01-16-2026 TIME: 04:28:40

USER:

COMMENTS: _____

```
**********************************************
** SIMULATION : 6hr SCS 10yr                **
**********************************************
```

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\15a0ef31-42bd-44d7-a726-d69de60405b3\f41cadb7
Ptotal= 55.81 mm	Comments: 6hr SCS 10yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	5.58	3.50	12.28	5.25	2.23
0.25	2.23	2.00	5.58	3.75	5.58	5.50	2.23
0.50	2.23	2.25	6.70	4.00	5.58	5.75	2.23
0.75	3.35	2.50	6.70	4.25	4.46	6.00	2.23
1.00	3.35	2.75	33.49	4.50	4.46		
1.25	3.35	3.00	87.06	4.75	3.35		
1.50	3.35	3.25	12.28	5.00	3.35		

CALIB STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.35	3.167	87.06	4.73	4.46
0.067	0.00	1.633	3.35	3.200	87.06	4.77	3.91
0.100	0.00	1.667	3.35	3.233	87.06	4.80	3.35
0.133	0.00	1.700	3.35	3.267	49.67	4.83	3.35
0.167	0.00	1.733	3.35	3.300	12.28	4.87	3.35
0.200	0.00	1.767	4.46	3.333	12.28	4.90	3.35
0.233	0.00	1.800	5.58	3.367	12.28	4.93	3.35
0.267	1.12	1.833	5.58	3.400	12.28	4.97	3.35
0.300	2.23	1.867	5.58	3.433	12.28	5.00	3.35
0.333	2.23	1.900	5.58	3.467	12.28	5.03	3.35
0.367	2.23	1.933	5.58	3.500	12.28	5.07	3.35
0.400	2.23	1.967	5.58	3.533	12.28	5.10	3.35
0.433	2.23	2.000	5.58	3.567	12.28	5.13	3.35

0.467	2.23	2.033	5.58	3.600	12.28	5.17	3.35
0.500	2.23	2.067	5.58	3.633	12.28	5.20	3.35
0.533	2.23	2.100	5.58	3.667	12.28	5.23	3.35
0.567	2.23	2.133	5.58	3.700	12.28	5.27	2.79
0.600	2.23	2.167	5.58	3.733	12.28	5.30	2.23
0.633	2.23	2.200	5.58	3.767	8.93	5.33	2.23
0.667	2.23	2.233	5.58	3.800	5.58	5.37	2.23
0.700	2.23	2.267	6.14	3.833	5.58	5.40	2.23
0.733	2.23	2.300	6.70	3.867	5.58	5.43	2.23
0.767	2.79	2.333	6.70	3.900	5.58	5.47	2.23
0.800	3.35	2.367	6.70	3.933	5.58	5.50	2.23
0.833	3.35	2.400	6.70	3.967	5.58	5.53	2.23
0.867	3.35	2.433	6.70	4.000	5.58	5.57	2.23
0.900	3.35	2.467	6.70	4.033	5.58	5.60	2.23
0.933	3.35	2.500	6.70	4.067	5.58	5.63	2.23
0.967	3.35	2.533	6.70	4.100	5.58	5.67	2.23
1.000	3.35	2.567	6.70	4.133	5.58	5.70	2.23
1.033	3.35	2.600	6.70	4.167	5.58	5.73	2.23
1.067	3.35	2.633	6.70	4.200	5.58	5.77	2.23
1.100	3.35	2.667	6.70	4.233	5.58	5.80	2.23
1.133	3.35	2.700	6.70	4.267	5.02	5.83	2.23
1.167	3.35	2.733	6.70	4.300	4.46	5.87	2.23
1.200	3.35	2.767	20.09	4.333	4.46	5.90	2.23
1.233	3.35	2.800	33.49	4.367	4.46	5.93	2.23
1.267	3.35	2.833	33.49	4.400	4.46	5.97	2.23
1.300	3.35	2.867	33.49	4.433	4.46	6.00	2.23
1.333	3.35	2.900	33.49	4.467	4.46	6.03	2.23
1.367	3.35	2.933	33.49	4.500	4.46	6.07	2.23
1.400	3.35	2.967	33.49	4.533	4.46	6.10	2.23
1.433	3.35	3.000	33.49	4.567	4.46	6.13	2.23
1.467	3.35	3.033	87.06	4.600	4.46	6.17	2.23
1.500	3.35	3.067	87.06	4.633	4.46	6.20	2.23
1.533	3.35	3.100	87.06	4.667	4.46	6.23	2.23
1.567	3.35	3.133	87.06	4.700	4.46	6.27	1.12

				TOTALS
Max.Eff.Inten.(mm/hr)=		87.06	32.11	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.23 (ii)	5.83 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.49	0.19	
PEAK FLOW	(cms)=	0.02	0.00	0.022 (iii)
TIME TO PEAK	(hrs)=	3.23	3.27	3.23
RUNOFF VOLUME	(mm)=	53.81	16.70	45.26
TOTAL RAINFALL	(mm)=	55.81	55.81	55.81
RUNOFF COEFFICIENT	=	0.96	0.30	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.35	3.167	87.06	4.73	4.46
0.067	0.00	1.633	3.35	3.200	87.06	4.77	3.91
0.100	0.00	1.667	3.35	3.233	87.06	4.80	3.35
0.133	0.00	1.700	3.35	3.267	49.67	4.83	3.35
0.167	0.00	1.733	3.35	3.300	12.28	4.87	3.35
0.200	0.00	1.767	4.46	3.333	12.28	4.90	3.35
0.233	0.00	1.800	5.58	3.367	12.28	4.93	3.35
0.267	1.12	1.833	5.58	3.400	12.28	4.97	3.35
0.300	2.23	1.867	5.58	3.433	12.28	5.00	3.35
0.333	2.23	1.900	5.58	3.467	12.28	5.03	3.35
0.367	2.23	1.933	5.58	3.500	12.28	5.07	3.35
0.400	2.23	1.967	5.58	3.533	12.28	5.10	3.35
0.433	2.23	2.000	5.58	3.567	12.28	5.13	3.35
0.467	2.23	2.033	5.58	3.600	12.28	5.17	3.35
0.500	2.23	2.067	5.58	3.633	12.28	5.20	3.35
0.533	2.23	2.100	5.58	3.667	12.28	5.23	3.35
0.567	2.23	2.133	5.58	3.700	12.28	5.27	2.79
0.600	2.23	2.167	5.58	3.733	12.28	5.30	2.23
0.633	2.23	2.200	5.58	3.767	8.93	5.33	2.23
0.667	2.23	2.233	5.58	3.800	5.58	5.37	2.23
0.700	2.23	2.267	6.14	3.833	5.58	5.40	2.23
0.733	2.23	2.300	6.70	3.867	5.58	5.43	2.23
0.767	2.79	2.333	6.70	3.900	5.58	5.47	2.23
0.800	3.35	2.367	6.70	3.933	5.58	5.50	2.23

0.833	3.35	2.400	6.70	3.967	5.58	5.53	2.23
0.867	3.35	2.433	6.70	4.000	5.58	5.57	2.23
0.900	3.35	2.467	6.70	4.033	5.58	5.60	2.23
0.933	3.35	2.500	6.70	4.067	5.58	5.63	2.23
0.967	3.35	2.533	6.70	4.100	5.58	5.67	2.23
1.000	3.35	2.567	6.70	4.133	5.58	5.70	2.23
1.033	3.35	2.600	6.70	4.167	5.58	5.73	2.23
1.067	3.35	2.633	6.70	4.200	5.58	5.77	2.23
1.100	3.35	2.667	6.70	4.233	5.58	5.80	2.23
1.133	3.35	2.700	6.70	4.267	5.02	5.83	2.23
1.167	3.35	2.733	6.70	4.300	4.46	5.87	2.23
1.200	3.35	2.767	20.09	4.333	4.46	5.90	2.23
1.233	3.35	2.800	33.49	4.367	4.46	5.93	2.23
1.267	3.35	2.833	33.49	4.400	4.46	5.97	2.23
1.300	3.35	2.867	33.49	4.433	4.46	6.00	2.23
1.333	3.35	2.900	33.49	4.467	4.46	6.03	2.23
1.367	3.35	2.933	33.49	4.500	4.46	6.07	2.23
1.400	3.35	2.967	33.49	4.533	4.46	6.10	2.23
1.433	3.35	3.000	33.49	4.567	4.46	6.13	2.23
1.467	3.35	3.033	87.06	4.600	4.46	6.17	2.23
1.500	3.35	3.067	87.06	4.633	4.46	6.20	2.23
1.533	3.35	3.100	87.06	4.667	4.46	6.23	2.23
1.567	3.35	3.133	87.06	4.700	4.46	6.27	1.12

				TOTALS
Max.Eff.Inten.(mm/hr)=		87.06	30.78	
over (min)		5.00	14.00	
Storage Coeff. (min)=		2.16 (ii)	13.46 (ii)	
Unit Hyd. Tpeak (min)=		4.00	14.00	
Unit Hyd. peak (cms)=		0.39	0.08	
PEAK FLOW	(cms)=	0.06	0.02	0.078 (iii)
TIME TO PEAK	(hrs)=	3.23	3.40	3.23
RUNOFF VOLUME	(mm)=	53.81	16.70	30.05
TOTAL RAINFALL	(mm)=	55.81	55.81	55.81
RUNOFF COEFFICIENT	=	0.96	0.30	0.54

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				

ID1= 1 (	0110):	0.71	0.078	3.23	30.05
+ ID2= 2 (	0120):	0.11	0.022	3.23	45.26
ID = 3 (	0122):	0.82	0.100	3.23	32.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.35	3.167	87.06	4.73	4.46
0.067	0.00	1.633	3.35	3.200	87.06	4.77	3.91
0.100	0.00	1.667	3.35	3.233	87.06	4.80	3.35
0.133	0.00	1.700	3.35	3.267	49.67	4.83	3.35
0.167	0.00	1.733	3.35	3.300	12.28	4.87	3.35
0.200	0.00	1.767	4.46	3.333	12.28	4.90	3.35
0.233	0.00	1.800	5.58	3.367	12.28	4.93	3.35
0.267	1.12	1.833	5.58	3.400	12.28	4.97	3.35
0.300	2.23	1.867	5.58	3.433	12.28	5.00	3.35
0.333	2.23	1.900	5.58	3.467	12.28	5.03	3.35
0.367	2.23	1.933	5.58	3.500	12.28	5.07	3.35
0.400	2.23	1.967	5.58	3.533	12.28	5.10	3.35
0.433	2.23	2.000	5.58	3.567	12.28	5.13	3.35
0.467	2.23	2.033	5.58	3.600	12.28	5.17	3.35
0.500	2.23	2.067	5.58	3.633	12.28	5.20	3.35
0.533	2.23	2.100	5.58	3.667	12.28	5.23	3.35
0.567	2.23	2.133	5.58	3.700	12.28	5.27	2.79
0.600	2.23	2.167	5.58	3.733	12.28	5.30	2.23
0.633	2.23	2.200	5.58	3.767	8.93	5.33	2.23
0.667	2.23	2.233	5.58	3.800	5.58	5.37	2.23
0.700	2.23	2.267	6.14	3.833	5.58	5.40	2.23
0.733	2.23	2.300	6.70	3.867	5.58	5.43	2.23
0.767	2.79	2.333	6.70	3.900	5.58	5.47	2.23
0.800	3.35	2.367	6.70	3.933	5.58	5.50	2.23
0.833	3.35	2.400	6.70	3.967	5.58	5.53	2.23
0.867	3.35	2.433	6.70	4.000	5.58	5.57	2.23
0.900	3.35	2.467	6.70	4.033	5.58	5.60	2.23
0.933	3.35	2.500	6.70	4.067	5.58	5.63	2.23
0.967	3.35	2.533	6.70	4.100	5.58	5.67	2.23
1.000	3.35	2.567	6.70	4.133	5.58	5.70	2.23
1.033	3.35	2.600	6.70	4.167	5.58	5.73	2.23
1.067	3.35	2.633	6.70	4.200	5.58	5.77	2.23
1.100	3.35	2.667	6.70	4.233	5.58	5.80	2.23
1.133	3.35	2.700	6.70	4.267	5.02	5.83	2.23
1.167	3.35	2.733	6.70	4.300	4.46	5.87	2.23
1.200	3.35	2.767	20.09	4.333	4.46	5.90	2.23
1.233	3.35	2.800	33.49	4.367	4.46	5.93	2.23
1.267	3.35	2.833	33.49	4.400	4.46	5.97	2.23
1.300	3.35	2.867	33.49	4.433	4.46	6.00	2.23
1.333	3.35	2.900	33.49	4.467	4.46	6.03	2.23
1.367	3.35	2.933	33.49	4.500	4.46	6.07	2.23
1.400	3.35	2.967	33.49	4.533	4.46	6.10	2.23
1.433	3.35	3.000	33.49	4.567	4.46	6.13	2.23
1.467	3.35	3.033	87.06	4.600	4.46	6.17	2.23
1.500	3.35	3.067	87.06	4.633	4.46	6.20	2.23
1.533	3.35	3.100	87.06	4.667	4.46	6.23	2.23
1.567	3.35	3.133	87.06	4.700	4.46	6.27	1.12

Max.Eff.Inten.(mm/hr)=	87.06	20.81		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.68 (ii)	8.68 (ii)		
Unit Hyd. Tpeak (min)=	4.00	10.00		
Unit Hyd. peak (cms)=	0.44	0.12		
				TOTALS
PEAK FLOW (cms)=	0.04	0.01		0.045 (iii)
TIME TO PEAK (hrs)=	3.23	3.33		3.23
RUNOFF VOLUME (mm)=	53.81	11.00		34.10
TOTAL RAINFALL (mm)=	55.81	55.81		55.81
RUNOFF COEFFICIENT =	0.96	0.20		0.61

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

SCS 6 hr_Exsting Conditions

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.35	3.167	87.06	4.73	4.46
0.067	0.00	1.633	3.35	3.200	87.06	4.77	3.91
0.100	0.00	1.667	3.35	3.233	87.06	4.80	3.35
0.133	0.00	1.700	3.35	3.267	49.67	4.83	3.35
0.167	0.00	1.733	3.35	3.300	12.28	4.87	3.35
0.200	0.00	1.767	4.46	3.333	12.28	4.90	3.35
0.233	0.00	1.800	5.58	3.367	12.28	4.93	3.35
0.267	1.12	1.833	5.58	3.400	12.28	4.97	3.35
0.300	2.23	1.867	5.58	3.433	12.28	5.00	3.35
0.333	2.23	1.900	5.58	3.467	12.28	5.03	3.35
0.367	2.23	1.933	5.58	3.500	12.28	5.07	3.35
0.400	2.23	1.967	5.58	3.533	12.28	5.10	3.35
0.433	2.23	2.000	5.58	3.567	12.28	5.13	3.35
0.467	2.23	2.033	5.58	3.600	12.28	5.17	3.35
0.500	2.23	2.067	5.58	3.633	12.28	5.20	3.35
0.533	2.23	2.100	5.58	3.667	12.28	5.23	3.35
0.567	2.23	2.133	5.58	3.700	12.28	5.27	2.79
0.600	2.23	2.167	5.58	3.733	12.28	5.30	2.23
0.633	2.23	2.200	5.58	3.767	8.93	5.33	2.23
0.667	2.23	2.233	5.58	3.800	5.58	5.37	2.23
0.700	2.23	2.267	6.14	3.833	5.58	5.40	2.23
0.733	2.23	2.300	6.70	3.867	5.58	5.43	2.23
0.767	2.79	2.333	6.70	3.900	5.58	5.47	2.23
0.800	3.35	2.367	6.70	3.933	5.58	5.50	2.23
0.833	3.35	2.400	6.70	3.967	5.58	5.53	2.23
0.867	3.35	2.433	6.70	4.000	5.58	5.57	2.23
0.900	3.35	2.467	6.70	4.033	5.58	5.60	2.23
0.933	3.35	2.500	6.70	4.067	5.58	5.63	2.23
0.967	3.35	2.533	6.70	4.100	5.58	5.67	2.23
1.000	3.35	2.567	6.70	4.133	5.58	5.70	2.23
1.033	3.35	2.600	6.70	4.167	5.58	5.73	2.23
1.067	3.35	2.633	6.70	4.200	5.58	5.77	2.23
1.100	3.35	2.667	6.70	4.233	5.58	5.80	2.23
1.133	3.35	2.700	6.70	4.267	5.02	5.83	2.23
1.167	3.35	2.733	6.70	4.300	4.46	5.87	2.23
1.200	3.35	2.767	20.09	4.333	4.46	5.90	2.23
1.233	3.35	2.800	33.49	4.367	4.46	5.93	2.23
1.267	3.35	2.833	33.49	4.400	4.46	5.97	2.23
1.300	3.35	2.867	33.49	4.433	4.46	6.00	2.23
1.333	3.35	2.900	33.49	4.467	4.46	6.03	2.23
1.367	3.35	2.933	33.49	4.500	4.46	6.07	2.23
1.400	3.35	2.967	33.49	4.533	4.46	6.10	2.23
1.433	3.35	3.000	33.49	4.567	4.46	6.13	2.23
1.467	3.35	3.033	87.06	4.600	4.46	6.17	2.23
1.500	3.35	3.067	87.06	4.633	4.46	6.20	2.23
1.533	3.35	3.100	87.06	4.667	4.46	6.23	2.23
1.567	3.35	3.133	87.06	4.700	4.46	6.27	1.12

Max.Eff.Inten.(mm/hr)=	87.06	20.81		
over (min)	5.00	8.00		
Storage Coeff. (min)=	1.73 (ii)	6.84 (ii)		
Unit Hyd. Tpeak (min)=	4.00	8.00		
Unit Hyd. peak (cms)=	0.43	0.16		
				TOTALS
PEAK FLOW (cms)=	0.06	0.00		0.063 (iii)
TIME TO PEAK (hrs)=	3.23	3.30		3.23
RUNOFF VOLUME (mm)=	53.81	11.00		41.81
TOTAL RAINFALL (mm)=	55.81	55.81		55.81
RUNOFF COEFFICIENT =	0.96	0.20		0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.045	3.23	34.10
+ ID2= 2 (0160):	0.34	0.063	3.23	41.81
ID = 3 (0162):	0.65	0.109	3.23	38.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)

```
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0122):     0.82   0.100     3.23    32.09
     + ID2= 2 (  0162):     0.65   0.109     3.23    38.13
       ====================================================
       ID = 3 (  0167):     1.47   0.209     3.23    34.76

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0140)|   Area    (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      27.08        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.033    0.00 | 1.600    3.35 | 3.167   87.06 |  4.73    4.46
 0.067    0.00 | 1.633    3.35 | 3.200   87.06 |  4.77    3.91
 0.100    0.00 | 1.667    3.35 | 3.233   87.06 |  4.80    3.35
 0.133    0.00 | 1.700    3.35 | 3.267   49.67 |  4.83    3.35
 0.167    0.00 | 1.733    3.35 | 3.300   12.28 |  4.87    3.35
 0.200    0.00 | 1.767    4.46 | 3.333   12.28 |  4.90    3.35
 0.233    0.00 | 1.800    5.58 | 3.367   12.28 |  4.93    3.35
 0.267    1.12 | 1.833    5.58 | 3.400   12.28 |  4.97    3.35
 0.300    2.23 | 1.867    5.58 | 3.433   12.28 |  5.00    3.35
 0.333    2.23 | 1.900    5.58 | 3.467   12.28 |  5.03    3.35
 0.367    2.23 | 1.933    5.58 | 3.500   12.28 |  5.07    3.35
 0.400    2.23 | 1.967    5.58 | 3.533   12.28 |  5.10    3.35
 0.433    2.23 | 2.000    5.58 | 3.567   12.28 |  5.13    3.35
 0.467    2.23 | 2.033    5.58 | 3.600   12.28 |  5.17    3.35
 0.500    2.23 | 2.067    5.58 | 3.633   12.28 |  5.20    3.35
 0.533    2.23 | 2.100    5.58 | 3.667   12.28 |  5.23    3.35
 0.567    2.23 | 2.133    5.58 | 3.700   12.28 |  5.27    2.79
 0.600    2.23 | 2.167    5.58 | 3.733   12.28 |  5.30    2.23
 0.633    2.23 | 2.200    5.58 | 3.767    8.93 |  5.33    2.23
 0.667    2.23 | 2.233    5.58 | 3.800    5.58 |  5.37    2.23
 0.700    2.23 | 2.267    6.14 | 3.833    5.58 |  5.40    2.23
 0.733    2.23 | 2.300    6.70 | 3.867    5.58 |  5.43    2.23
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 0.767    2.79 | 2.333    6.70 | 3.900    5.58 |  5.47    2.23
 0.800    3.35 | 2.367    6.70 | 3.933    5.58 |  5.50    2.23
 0.833    3.35 | 2.400    6.70 | 3.967    5.58 |  5.53    2.23
 0.867    3.35 | 2.433    6.70 | 4.000    5.58 |  5.57    2.23
 0.900    3.35 | 2.467    6.70 | 4.033    5.58 |  5.60    2.23
 0.933    3.35 | 2.500    6.70 | 4.067    5.58 |  5.63    2.23
 0.967    3.35 | 2.533    6.70 | 4.100    5.58 |  5.67    2.23
 1.000    3.35 | 2.567    6.70 | 4.133    5.58 |  5.70    2.23
 1.033    3.35 | 2.600    6.70 | 4.167    5.58 |  5.73    2.23
 1.067    3.35 | 2.633    6.70 | 4.200    5.58 |  5.77    2.23
 1.100    3.35 | 2.667    6.70 | 4.233    5.58 |  5.80    2.23
 1.133    3.35 | 2.700    6.70 | 4.267    5.02 |  5.83    2.23
 1.167    3.35 | 2.733    6.70 | 4.300    4.46 |  5.87    2.23
 1.200    3.35 | 2.767   20.09 | 4.333    4.46 |  5.90    2.23
 1.233    3.35 | 2.800   33.49 | 4.367    4.46 |  5.93    2.23
 1.267    3.35 | 2.833   33.49 | 4.400    4.46 |  5.97    2.23
 1.300    3.35 | 2.867   33.49 | 4.433    4.46 |  6.00    2.23
 1.333    3.35 | 2.900   33.49 | 4.467    4.46 |  6.03    2.23
 1.367    3.35 | 2.933   33.49 | 4.500    4.46 |  6.07    2.23
 1.400    3.35 | 2.967   33.49 | 4.533    4.46 |  6.10    2.23
 1.433    3.35 | 3.000   33.49 | 4.567    4.46 |  6.13    2.23
 1.467    3.35 | 3.033   87.06 | 4.600    4.46 |  6.17    2.23
 1.500    3.35 | 3.067   87.06 | 4.633    4.46 |  6.20    2.23
 1.533    3.35 | 3.100   87.06 | 4.667    4.46 |  6.23    2.23
 1.567    3.35 | 3.133   87.06 | 4.700    4.46 |  6.27    1.12

     Max.Eff.Inten.(mm/hr)=      87.06        20.81
                  over (min)       5.00         6.00
     Storage Coeff.  (min)=       1.23 (ii)    5.94 (ii)
     Unit Hyd. Tpeak (min)=       4.00         6.00
     Unit Hyd. peak  (cms)=       0.49         0.19
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.021 (iii)
     TIME TO PEAK    (hrs)=       3.23         3.27          3.23
     RUNOFF VOLUME    (mm)=      53.81        11.00         43.51
     TOTAL RAINFALL   (mm)=      55.81        55.81         55.81
     RUNOFF COEFFICIENT   =       0.96         0.20          0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
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132e31-30eb-4b95-a6c7-0729a1361767\sc
  Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\6c
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DATE: 01-16-2026                          TIME: 04:28:40

USER:



COMMENTS: _____________________________________________________


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  ***********************************************
  ** SIMULATION : 6hr SCS 25yr                 **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\Yuan.Yuan\AppD
|                  |              ata\Local\Temp\
|                  |              15a0ef31-42bd-44d7-a726-d69de60405b3\0708712b
```



```
| Ptotal= 65.74 mm |    Comments: 6hr SCS 25yr
--------------------
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.00    0.00 |  1.75    6.57 |  3.50   14.46 |  5.25    2.63
                  0.25    2.63 |  2.00    6.57 |  3.75    6.57 |  5.50    2.63
                  0.50    2.63 |  2.25    7.89 |  4.00    6.57 |  5.75    2.63
                  0.75    3.94 |  2.50    7.89 |  4.25    5.26 |  6.00    2.63
                  1.00    3.94 |  2.75   39.44 |  4.50    5.26 |
                  1.25    3.94 |  3.00  102.55 |  4.75    3.94 |
                  1.50    3.94 |  3.25   14.46 |  5.00    3.94 |

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| CALIB            |
| STANDHYD (  0120)|   Area    (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  77.00   Dir. Conn.(%)=  77.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      27.08        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.033    0.00 | 1.600    3.94 | 3.167  102.55 |  4.73    5.26
 0.067    0.00 | 1.633    3.94 | 3.200  102.55 |  4.77    4.60
 0.100    0.00 | 1.667    3.94 | 3.233  102.55 |  4.80    3.94
 0.133    0.00 | 1.700    3.94 | 3.267   58.51 |  4.83    3.94
 0.167    0.00 | 1.733    3.94 | 3.300   14.46 |  4.87    3.94
 0.200    0.00 | 1.767    5.26 | 3.333   14.46 |  4.90    3.94
 0.233    0.00 | 1.800    6.57 | 3.367   14.46 |  4.93    3.94
 0.267    1.31 | 1.833    6.57 | 3.400   14.46 |  4.97    3.94
 0.300    2.63 | 1.867    6.57 | 3.433   14.46 |  5.00    3.94
 0.333    2.63 | 1.900    6.57 | 3.467   14.46 |  5.03    3.94
 0.367    2.63 | 1.933    6.57 | 3.500   14.46 |  5.07    3.94
 0.400    2.63 | 1.967    6.57 | 3.533   14.46 |  5.10    3.94
 0.433    2.63 | 2.000    6.57 | 3.567   14.46 |  5.13    3.94
 0.467    2.63 | 2.033    6.57 | 3.600   14.46 |  5.17    3.94
 0.500    2.63 | 2.067    6.57 | 3.633   14.46 |  5.20    3.94
 0.533    2.63 | 2.100    6.57 | 3.667   14.46 |  5.23    3.94
 0.567    2.63 | 2.133    6.57 | 3.700   14.46 |  5.27    3.29
```

0.600	2.63	2.167	6.57	3.733	14.46	5.30	2.63
0.633	2.63	2.200	6.57	3.767	10.52	5.33	2.63
0.667	2.63	2.233	6.57	3.800	6.57	5.37	2.63
0.700	2.63	2.267	7.23	3.833	6.57	5.40	2.63
0.733	2.63	2.300	7.89	3.867	6.57	5.43	2.63
0.767	3.29	2.333	7.89	3.900	6.57	5.47	2.63
0.800	3.94	2.367	7.89	3.933	6.57	5.50	2.63
0.833	3.94	2.400	7.89	3.967	6.57	5.53	2.63
0.867	3.94	2.433	7.89	4.000	6.57	5.57	2.63
0.900	3.94	2.467	7.89	4.033	6.57	5.60	2.63
0.933	3.94	2.500	7.89	4.067	6.57	5.63	2.63
0.967	3.94	2.533	7.89	4.100	6.57	5.67	2.63
1.000	3.94	2.567	7.89	4.133	6.57	5.70	2.63
1.033	3.94	2.600	7.89	4.167	6.57	5.73	2.63
1.067	3.94	2.633	7.89	4.200	6.57	5.77	2.63
1.100	3.94	2.667	7.89	4.233	6.57	5.80	2.63
1.133	3.94	2.700	7.89	4.267	5.92	5.83	2.63
1.167	3.94	2.733	7.89	4.300	5.26	5.87	2.63
1.200	3.94	2.767	23.67	4.333	5.26	5.90	2.63
1.233	3.94	2.800	39.44	4.367	5.26	5.93	2.63
1.267	3.94	2.833	39.44	4.400	5.26	5.97	2.63
1.300	3.94	2.867	39.44	4.433	5.26	6.00	2.63
1.333	3.94	2.900	39.44	4.467	5.26	6.03	2.63
1.367	3.94	2.933	39.44	4.500	5.26	6.07	2.63
1.400	3.94	2.967	39.44	4.533	5.26	6.10	2.63
1.433	3.94	3.000	39.44	4.567	5.26	6.13	2.63
1.467	3.94	3.033	102.55	4.600	5.26	6.17	2.63
1.500	3.94	3.067	102.55	4.633	5.26	6.20	2.63
1.533	3.94	3.100	102.55	4.667	5.26	6.23	2.63
1.567	3.94	3.133	102.55	4.700	5.26	6.27	1.32

Max.Eff.Inten.(mm/hr)=	102.55	43.06	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.15 (ii)	5.46 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.027 (iii)
TIME TO PEAK (hrs)=	3.23	3.27	3.23
RUNOFF VOLUME (mm)=	63.74	22.43	54.22
TOTAL RAINFALL (mm)=	65.74	65.74	65.74
RUNOFF COEFFICIENT =	0.97	0.34	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.94	3.167	102.55	4.73	5.26
0.067	0.00	1.633	3.94	3.200	102.55	4.77	4.60
0.100	0.00	1.667	3.94	3.233	102.55	4.80	3.94
0.133	0.00	1.700	3.94	3.267	58.51	4.83	3.94
0.167	0.00	1.733	3.94	3.300	14.46	4.87	3.94
0.200	0.00	1.767	5.26	3.333	14.46	4.90	3.94
0.233	0.00	1.800	6.57	3.367	14.46	4.93	3.94
0.267	1.31	1.833	6.57	3.400	14.46	4.97	3.94
0.300	2.63	1.867	6.57	3.433	14.46	5.00	3.94
0.333	2.63	1.900	6.57	3.467	14.46	5.03	3.94
0.367	2.63	1.933	6.57	3.500	14.46	5.07	3.94
0.400	2.63	1.967	6.57	3.533	14.46	5.10	3.94
0.433	2.63	2.000	6.57	3.567	14.46	5.13	3.94
0.467	2.63	2.033	6.57	3.600	14.46	5.17	3.94
0.500	2.63	2.067	6.57	3.633	14.46	5.20	3.94
0.533	2.63	2.100	6.57	3.667	14.46	5.23	3.94
0.567	2.63	2.133	6.57	3.700	14.46	5.27	3.29
0.600	2.63	2.167	6.57	3.733	14.46	5.30	2.63
0.633	2.63	2.200	6.57	3.767	10.52	5.33	2.63
0.667	2.63	2.233	6.57	3.800	6.57	5.37	2.63
0.700	2.63	2.267	7.23	3.833	6.57	5.40	2.63
0.733	2.63	2.300	7.89	3.867	6.57	5.43	2.63
0.767	3.29	2.333	7.89	3.900	6.57	5.47	2.63
0.800	3.94	2.367	7.89	3.933	6.57	5.50	2.63
0.833	3.94	2.400	7.89	3.967	6.57	5.53	2.63
0.867	3.94	2.433	7.89	4.000	6.57	5.57	2.63
0.900	3.94	2.467	7.89	4.033	6.57	5.60	2.63
0.933	3.94	2.500	7.89	4.067	6.57	5.63	2.63

0.967	3.94	2.533	7.89	4.100	6.57	5.67	2.63
1.000	3.94	2.567	7.89	4.133	6.57	5.70	2.63
1.033	3.94	2.600	7.89	4.167	6.57	5.73	2.63
1.067	3.94	2.633	7.89	4.200	6.57	5.77	2.63
1.100	3.94	2.667	7.89	4.233	6.57	5.80	2.63
1.133	3.94	2.700	7.89	4.267	5.92	5.83	2.63
1.167	3.94	2.733	7.89	4.300	5.26	5.87	2.63
1.200	3.94	2.767	23.67	4.333	5.26	5.90	2.63
1.233	3.94	2.800	39.44	4.367	5.26	5.93	2.63
1.267	3.94	2.833	39.44	4.400	5.26	5.97	2.63
1.300	3.94	2.867	39.44	4.433	5.26	6.00	2.63
1.333	3.94	2.900	39.44	4.467	5.26	6.03	2.63
1.367	3.94	2.933	39.44	4.500	5.26	6.07	2.63
1.400	3.94	2.967	39.44	4.533	5.26	6.10	2.63
1.433	3.94	3.000	39.44	4.567	5.26	6.13	2.63
1.467	3.94	3.033	102.55	4.600	5.26	6.17	2.63
1.500	3.94	3.067	102.55	4.633	5.26	6.20	2.63
1.533	3.94	3.100	102.55	4.667	5.26	6.23	2.63
1.567	3.94	3.133	102.55	4.700	5.26	6.27	1.32

Max.Eff.Inten.(mm/hr)=	102.55	43.06	
over (min)	5.00	12.00	
Storage Coeff. (min)=	2.02 (ii)	11.91 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.41	0.09	
			TOTALS
PEAK FLOW (cms)=	0.07	0.03	0.099 (iii)
TIME TO PEAK (hrs)=	3.23	3.37	3.23
RUNOFF VOLUME (mm)=	63.74	22.43	37.29
TOTAL RAINFALL (mm)=	65.74	65.74	65.74
RUNOFF COEFFICIENT =	0.97	0.34	0.57

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0110):	0.71	0.099	3.23	37.29
+ ID2= 2 (0120):	0.11	0.027	3.23	54.22
ID = 3 (0122):	0.82	0.126	3.23	39.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.94	3.167	102.55	4.73	5.26
0.067	0.00	1.633	3.94	3.200	102.55	4.77	4.60
0.100	0.00	1.667	3.94	3.233	102.55	4.80	3.94
0.133	0.00	1.700	3.94	3.267	58.51	4.83	3.94
0.167	0.00	1.733	3.94	3.300	14.46	4.87	3.94
0.200	0.00	1.767	5.26	3.333	14.46	4.90	3.94
0.233	0.00	1.800	6.57	3.367	14.46	4.93	3.94
0.267	1.31	1.833	6.57	3.400	14.46	4.97	3.94
0.300	2.63	1.867	6.57	3.433	14.46	5.00	3.94
0.333	2.63	1.900	6.57	3.467	14.46	5.03	3.94
0.367	2.63	1.933	6.57	3.500	14.46	5.07	3.94
0.400	2.63	1.967	6.57	3.533	14.46	5.10	3.94
0.433	2.63	2.000	6.57	3.567	14.46	5.13	3.94
0.467	2.63	2.033	6.57	3.600	14.46	5.17	3.94
0.500	2.63	2.067	6.57	3.633	14.46	5.20	3.94
0.533	2.63	2.100	6.57	3.667	14.46	5.23	3.94
0.567	2.63	2.133	6.57	3.700	14.46	5.27	3.29
0.600	2.63	2.167	6.57	3.733	14.46	5.30	2.63
0.633	2.63	2.200	6.57	3.767	10.52	5.33	2.63
0.667	2.63	2.233	6.57	3.800	6.57	5.37	2.63
0.700	2.63	2.267	7.23	3.833	6.57	5.40	2.63
0.733	2.63	2.300	7.89	3.867	6.57	5.43	2.63
0.767	3.29	2.333	7.89	3.900	6.57	5.47	2.63
0.800	3.94	2.367	7.89	3.933	6.57	5.50	2.63
0.833	3.94	2.400	7.89	3.967	6.57	5.53	2.63
0.867	3.94	2.433	7.89	4.000	6.57	5.57	2.63
0.900	3.94	2.467	7.89	4.033	6.57	5.60	2.63
0.933	3.94	2.500	7.89	4.067	6.57	5.63	2.63

0.967	3.94	2.533	7.89	4.100	6.57	5.67	2.63
1.000	3.94	2.567	7.89	4.133	6.57	5.70	2.63
1.033	3.94	2.600	7.89	4.167	6.57	5.73	2.63
1.067	3.94	2.633	7.89	4.200	6.57	5.77	2.63
1.100	3.94	2.667	7.89	4.233	6.57	5.80	2.63
1.133	3.94	2.700	7.89	4.267	5.92	5.83	2.63
1.167	3.94	2.733	7.89	4.300	5.26	5.87	2.63
1.200	3.94	2.767	23.67	4.333	5.26	5.90	2.63
1.233	3.94	2.800	39.44	4.367	5.26	5.93	2.63
1.267	3.94	2.833	39.44	4.400	5.26	5.97	2.63
1.300	3.94	2.867	39.44	4.433	5.26	6.00	2.63
1.333	3.94	2.900	39.44	4.467	5.26	6.03	2.63
1.367	3.94	2.933	39.44	4.500	5.26	6.07	2.63
1.400	3.94	2.967	39.44	4.533	5.26	6.10	2.63
1.433	3.94	3.000	39.44	4.567	5.26	6.13	2.63
1.467	3.94	3.033	102.55	4.600	5.26	6.17	2.63
1.500	3.94	3.067	102.55	4.633	5.26	6.20	2.63
1.533	3.94	3.100	102.55	4.667	5.26	6.23	2.63
1.567	3.94	3.133	102.55	4.700	5.26	6.27	1.32

Max.Eff.Inten.(mm/hr)=	102.55	28.53	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.58 (ii)	8.13 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.45	0.13	
			TOTALS
PEAK FLOW (cms)=	0.05	0.01	0.055 (iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23
RUNOFF VOLUME (mm)=	63.74	15.08	41.34
TOTAL RAINFALL (mm)=	65.74	65.74	65.74
RUNOFF COEFFICIENT =	0.97	0.23	0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00

Average Slope	(%)=	1.00 2.00
Length	(m)=	47.61 40.00
Mannings n	=	0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.94	3.167	102.55	4.73	5.26
0.067	0.00	1.633	3.94	3.200	102.55	4.77	4.60
0.100	0.00	1.667	3.94	3.233	102.55	4.80	3.94
0.133	0.00	1.700	3.94	3.267	58.51	4.83	3.94
0.167	0.00	1.733	3.94	3.300	14.46	4.87	3.94
0.200	0.00	1.767	5.26	3.333	14.46	4.90	3.94
0.233	0.00	1.800	6.57	3.367	14.46	4.93	3.94
0.267	1.31	1.833	6.57	3.400	14.46	4.97	3.94
0.300	2.63	1.867	6.57	3.433	14.46	5.00	3.94
0.333	2.63	1.900	6.57	3.467	14.46	5.03	3.94
0.367	2.63	1.933	6.57	3.500	14.46	5.07	3.94
0.400	2.63	1.967	6.57	3.533	14.46	5.10	3.94
0.433	2.63	2.000	6.57	3.567	14.46	5.13	3.94
0.467	2.63	2.033	6.57	3.600	14.46	5.17	3.94
0.500	2.63	2.067	6.57	3.633	14.46	5.20	3.94
0.533	2.63	2.100	6.57	3.667	14.46	5.23	3.94
0.567	2.63	2.133	6.57	3.700	14.46	5.27	3.29
0.600	2.63	2.167	6.57	3.733	14.46	5.30	2.63
0.633	2.63	2.200	6.57	3.767	10.52	5.33	2.63
0.667	2.63	2.233	6.57	3.800	6.57	5.37	2.63
0.700	2.63	2.267	7.23	3.833	6.57	5.40	2.63
0.733	2.63	2.300	7.89	3.867	6.57	5.43	2.63
0.767	3.29	2.333	7.89	3.900	6.57	5.47	2.63
0.800	3.94	2.367	7.89	3.933	6.57	5.50	2.63
0.833	3.94	2.400	7.89	3.967	6.57	5.53	2.63
0.867	3.94	2.433	7.89	4.000	6.57	5.57	2.63
0.900	3.94	2.467	7.89	4.033	6.57	5.60	2.63
0.933	3.94	2.500	7.89	4.067	6.57	5.63	2.63
0.967	3.94	2.533	7.89	4.100	6.57	5.67	2.63
1.000	3.94	2.567	7.89	4.133	6.57	5.70	2.63
1.033	3.94	2.600	7.89	4.167	6.57	5.73	2.63
1.067	3.94	2.633	7.89	4.200	6.57	5.77	2.63
1.100	3.94	2.667	7.89	4.233	6.57	5.80	2.63
1.133	3.94	2.700	7.89	4.267	5.92	5.83	2.63
1.167	3.94	2.733	7.89	4.300	5.26	5.87	2.63
1.200	3.94	2.767	23.67	4.333	5.26	5.90	2.63
1.233	3.94	2.800	39.44	4.367	5.26	5.93	2.63
1.267	3.94	2.833	39.44	4.400	5.26	5.97	2.63
1.300	3.94	2.867	39.44	4.433	5.26	6.00	2.63

1.333	3.94	2.900	39.44	4.467	5.26	6.03	2.63
1.367	3.94	2.933	39.44	4.500	5.26	6.07	2.63
1.400	3.94	2.967	39.44	4.533	5.26	6.10	2.63
1.433	3.94	3.000	39.44	4.567	5.26	6.13	2.63
1.467	3.94	3.033	102.55	4.600	5.26	6.17	2.63
1.500	3.94	3.067	102.55	4.633	5.26	6.20	2.63
1.533	3.94	3.100	102.55	4.667	5.26	6.23	2.63
1.567	3.94	3.133	102.55	4.700	5.26	6.27	1.32

Max.Eff.Inten.(mm/hr)=	102.55	28.53	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.62 (ii)	6.41 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.44	0.16	
			TOTALS
PEAK FLOW (cms)=	0.07	0.01	0.075 (iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23
RUNOFF VOLUME (mm)=	63.74	15.08	50.11
TOTAL RAINFALL (mm)=	65.74	65.74	65.74
RUNOFF COEFFICIENT =	0.97	0.23	0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.055	3.23	41.34
+ ID2= 2 (0160):	0.34	0.075	3.23	50.11
ID = 3 (0162):	0.65	0.130	3.23	45.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.126	3.23	39.56
+ ID2= 2 (0162):	0.65	0.130	3.23	45.93

ID = 3 (0167):	1.47	0.256	3.23	42.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0140)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	3.94	3.167	102.55	4.73	5.26
0.067	0.00	1.633	3.94	3.200	102.55	4.77	4.60
0.100	0.00	1.667	3.94	3.233	102.55	4.80	3.94
0.133	0.00	1.700	3.94	3.267	58.51	4.83	3.94
0.167	0.00	1.733	3.94	3.300	14.46	4.87	3.94
0.200	0.00	1.767	5.26	3.333	14.46	4.90	3.94
0.233	0.00	1.800	6.57	3.367	14.46	4.93	3.94
0.267	1.31	1.833	6.57	3.400	14.46	4.97	3.94
0.300	2.63	1.867	6.57	3.433	14.46	5.00	3.94
0.333	2.63	1.900	6.57	3.467	14.46	5.03	3.94
0.367	2.63	1.933	6.57	3.500	14.46	5.07	3.94
0.400	2.63	1.967	6.57	3.533	14.46	5.10	3.94
0.433	2.63	2.000	6.57	3.567	14.46	5.13	3.94
0.467	2.63	2.033	6.57	3.600	14.46	5.17	3.94
0.500	2.63	2.067	6.57	3.633	14.46	5.20	3.94
0.533	2.63	2.100	6.57	3.667	14.46	5.23	3.94
0.567	2.63	2.133	6.57	3.700	14.46	5.27	3.29
0.600	2.63	2.167	6.57	3.733	14.46	5.30	2.63
0.633	2.63	2.200	6.57	3.767	10.52	5.33	2.63
0.667	2.63	2.233	6.57	3.800	6.57	5.37	2.63
0.700	2.63	2.267	7.23	3.833	6.57	5.40	2.63
0.733	2.63	2.300	7.89	3.867	6.57	5.43	2.63
0.767	3.29	2.333	7.89	3.900	6.57	5.47	2.63
0.800	3.94	2.367	7.89	3.933	6.57	5.50	2.63
0.833	3.94	2.400	7.89	3.967	6.57	5.53	2.63
0.867	3.94	2.433	7.89	4.000	6.57	5.57	2.63

0.900	3.94	2.467	7.89	4.033	6.57	5.60	2.63
0.933	3.94	2.500	7.89	4.067	6.57	5.63	2.63
0.967	3.94	2.533	7.89	4.100	6.57	5.67	2.63
1.000	3.94	2.567	7.89	4.133	6.57	5.70	2.63
1.033	3.94	2.600	7.89	4.167	6.57	5.73	2.63
1.067	3.94	2.633	7.89	4.200	6.57	5.77	2.63
1.100	3.94	2.667	7.89	4.233	6.57	5.80	2.63
1.133	3.94	2.700	7.89	4.267	5.92	5.83	2.63
1.167	3.94	2.733	7.89	4.300	5.26	5.87	2.63
1.200	3.94	2.767	23.67	4.333	5.26	5.90	2.63
1.233	3.94	2.800	39.44	4.367	5.26	5.93	2.63
1.267	3.94	2.833	39.44	4.400	5.26	5.97	2.63
1.300	3.94	2.867	39.44	4.433	5.26	6.00	2.63
1.333	3.94	2.900	39.44	4.467	5.26	6.03	2.63
1.367	3.94	2.933	39.44	4.500	5.26	6.07	2.63
1.400	3.94	2.967	39.44	4.533	5.26	6.10	2.63
1.433	3.94	3.000	39.44	4.567	5.26	6.13	2.63
1.467	3.94	3.033	102.55	4.600	5.26	6.17	2.63
1.500	3.94	3.067	102.55	4.633	5.26	6.20	2.63
1.533	3.94	3.100	102.55	4.667	5.26	6.23	2.63
1.567	3.94	3.133	102.55	4.700	5.26	6.27	1.32

Max.Eff.Inten.(mm/hr)=	102.55	28.53	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.15 (ii)	5.56 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.026 (iii)
TIME TO PEAK (hrs)=	3.23	3.27	3.23
RUNOFF VOLUME (mm)=	63.74	15.08	52.04
TOTAL RAINFALL (mm)=	65.74	65.74	65.74
RUNOFF COEFFICIENT =	0.97	0.23	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
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        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\b3e6a74c-d73a-4372-9d86-c33f6a8b61b8\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\b3e6a74c-d73a-4372-9d86-c33f6a8b61b8\sc

DATE: 01-16-2026 TIME: 04:28:40

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : 6hr SCS 2yr                   **
  ************************************************
```

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\15a0ef31-42bd-44d7-a726-d69de60405b3\9a7f4fbf
Ptotal= 40.15 mm	Comments: 6hr SCS 2yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

0.00	0.00	1.75	4.01	3.50	8.83	5.25	1.61
0.25	1.61	2.00	4.01	3.75	4.01	5.50	1.61
0.50	1.61	2.25	4.82	4.00	4.01	5.75	1.61
0.75	2.41	2.50	4.82	4.25	3.21	6.00	1.61
1.00	2.41	2.75	24.09	4.50	3.21		
1.25	2.41	3.00	62.63	4.75	2.41		
1.50	2.41	3.25	8.83	5.00	2.41		

CALIB	
STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.41	3.167	62.63	4.73	3.21
0.067	0.00	1.633	2.41	3.200	62.63	4.77	2.81
0.100	0.00	1.667	2.41	3.233	62.63	4.80	2.41
0.133	0.00	1.700	2.41	3.267	35.74	4.83	2.41
0.167	0.00	1.733	2.41	3.300	8.83	4.87	2.41
0.200	0.00	1.767	3.21	3.333	8.83	4.90	2.41
0.233	0.00	1.800	4.02	3.367	8.83	4.93	2.41
0.267	0.80	1.833	4.02	3.400	8.83	4.97	2.41
0.300	1.61	1.867	4.02	3.433	8.83	5.00	2.41
0.333	1.61	1.900	4.02	3.467	8.83	5.03	2.41
0.367	1.61	1.933	4.02	3.500	8.83	5.07	2.41
0.400	1.61	1.967	4.02	3.533	8.83	5.10	2.41
0.433	1.61	2.000	4.02	3.567	8.83	5.13	2.41
0.467	1.61	2.033	4.01	3.600	8.83	5.17	2.41
0.500	1.61	2.067	4.02	3.633	8.83	5.20	2.41
0.533	1.61	2.100	4.02	3.667	8.83	5.23	2.41
0.567	1.61	2.133	4.02	3.700	8.83	5.27	2.01
0.600	1.61	2.167	4.02	3.733	8.83	5.30	1.61
0.633	1.61	2.200	4.02	3.767	6.42	5.33	1.61
0.667	1.61	2.233	4.02	3.800	4.02	5.37	1.61
0.700	1.61	2.267	4.42	3.833	4.02	5.40	1.61

0.733	1.61	2.300	4.82	3.867	4.02	5.43	1.61
0.767	2.01	2.333	4.82	3.900	4.02	5.47	1.61
0.800	2.41	2.367	4.82	3.933	4.02	5.50	1.61
0.833	2.41	2.400	4.82	3.967	4.02	5.53	1.61
0.867	2.41	2.433	4.82	4.000	4.02	5.57	1.61
0.900	2.41	2.467	4.82	4.033	4.01	5.60	1.61
0.933	2.41	2.500	4.82	4.067	4.02	5.63	1.61
0.967	2.41	2.533	4.82	4.100	4.02	5.67	1.61
1.000	2.41	2.567	4.82	4.133	4.02	5.70	1.61
1.033	2.41	2.600	4.82	4.167	4.02	5.73	1.61
1.067	2.41	2.633	4.82	4.200	4.02	5.77	1.61
1.100	2.41	2.667	4.82	4.233	4.02	5.80	1.61
1.133	2.41	2.700	4.82	4.267	3.61	5.83	1.61
1.167	2.41	2.733	4.82	4.300	3.21	5.87	1.61
1.200	2.41	2.767	14.45	4.333	3.21	5.90	1.61
1.233	2.41	2.800	24.09	4.367	3.21	5.93	1.61
1.267	2.41	2.833	24.09	4.400	3.21	5.97	1.61
1.300	2.41	2.867	24.09	4.433	3.21	6.00	1.61
1.333	2.41	2.900	24.09	4.467	3.21	6.03	1.61
1.367	2.41	2.933	24.09	4.500	3.21	6.07	1.61
1.400	2.41	2.967	24.09	4.533	3.21	6.10	1.61
1.433	2.41	3.000	24.09	4.567	3.21	6.13	1.61
1.467	2.41	3.033	62.63	4.600	3.21	6.17	1.61
1.500	2.41	3.067	62.63	4.633	3.21	6.20	1.61
1.533	2.41	3.100	62.63	4.667	3.21	6.23	1.61
1.567	2.41	3.133	62.63	4.700	3.21	6.27	0.80

Max.Eff.Inten.(mm/hr)=	62.63	17.10	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.41 (ii)	6.66 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.16	
			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.016 (iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23
RUNOFF VOLUME (mm)=	38.15	8.90	31.40
TOTAL RAINFALL (mm)=	40.15	40.15	40.15
RUNOFF COEFFICIENT =	0.95	0.22	0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

SCS 6 hr_Exsting Conditions

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.41	3.167	62.63	4.73	3.21
0.067	0.00	1.633	2.41	3.200	62.63	4.77	2.81
0.100	0.00	1.667	2.41	3.233	62.63	4.80	2.41
0.133	0.00	1.700	2.41	3.267	35.74	4.83	2.41
0.167	0.00	1.733	2.41	3.300	8.83	4.87	2.41
0.200	0.00	1.767	3.21	3.333	8.83	4.90	2.41
0.233	0.00	1.800	4.02	3.367	8.83	4.93	2.41
0.267	0.80	1.833	4.02	3.400	8.83	4.97	2.41
0.300	1.61	1.867	4.02	3.433	8.83	5.00	2.41
0.333	1.61	1.900	4.02	3.467	8.83	5.03	2.41
0.367	1.61	1.933	4.02	3.500	8.83	5.07	2.41
0.400	1.61	1.967	4.02	3.533	8.83	5.10	2.41
0.433	1.61	2.000	4.02	3.567	8.83	5.13	2.41
0.467	1.61	2.033	4.01	3.600	8.83	5.17	2.41
0.500	1.61	2.067	4.02	3.633	8.83	5.20	2.41
0.533	1.61	2.100	4.02	3.667	8.83	5.23	2.41
0.567	1.61	2.133	4.02	3.700	8.83	5.27	2.01
0.600	1.61	2.167	4.02	3.733	8.83	5.30	1.61
0.633	1.61	2.200	4.02	3.767	6.42	5.33	1.61
0.667	1.61	2.233	4.02	3.800	4.02	5.37	1.61
0.700	1.61	2.267	4.42	3.833	4.02	5.40	1.61
0.733	1.61	2.300	4.82	3.867	4.02	5.43	1.61
0.767	2.01	2.333	4.82	3.900	4.02	5.47	1.61
0.800	2.41	2.367	4.82	3.933	4.02	5.50	1.61
0.833	2.41	2.400	4.82	3.967	4.02	5.53	1.61
0.867	2.41	2.433	4.82	4.000	4.02	5.57	1.61
0.900	2.41	2.467	4.82	4.033	4.01	5.60	1.61
0.933	2.41	2.500	4.82	4.067	4.02	5.63	1.61
0.967	2.41	2.533	4.82	4.100	4.02	5.67	1.61
1.000	2.41	2.567	4.82	4.133	4.02	5.70	1.61
1.033	2.41	2.600	4.82	4.167	4.02	5.73	1.61
1.067	2.41	2.633	4.82	4.200	4.02	5.77	1.61
1.100	2.41	2.667	4.82	4.233	4.02	5.80	1.61
1.133	2.41	2.700	4.82	4.267	3.61	5.83	1.61
1.167	2.41	2.733	4.82	4.300	3.21	5.87	1.61
1.200	2.41	2.767	14.45	4.333	3.21	5.90	1.61
1.233	2.41	2.800	24.09	4.367	3.21	5.93	1.61
1.267	2.41	2.833	24.09	4.400	3.21	5.97	1.61
1.300	2.41	2.867	24.09	4.433	3.21	6.00	1.61
1.333	2.41	2.900	24.09	4.467	3.21	6.03	1.61
1.367	2.41	2.933	24.09	4.500	3.21	6.07	1.61
1.400	2.41	2.967	24.09	4.533	3.21	6.10	1.61
1.433	2.41	3.000	24.09	4.567	3.21	6.13	1.61
1.467	2.41	3.033	62.63	4.600	3.21	6.17	1.61
1.500	2.41	3.067	62.63	4.633	3.21	6.20	1.61
1.533	2.41	3.100	62.63	4.667	3.21	6.23	1.61
1.567	2.41	3.133	62.63	4.700	3.21	6.27	0.80

			TOTALS
Max.Eff.Inten.(mm/hr)=		62.63	15.00
over (min)		5.00	18.00
Storage Coeff. (min)=		2.46 (ii)	17.54 (ii)
Unit Hyd. Tpeak (min)=		4.00	18.00
Unit Hyd. peak (cms)=		0.37	0.06
PEAK FLOW	(cms)=	0.04	0.01 0.050 (iii)
TIME TO PEAK	(hrs)=	3.23	3.47 3.23
RUNOFF VOLUME	(mm)=	38.15	8.90 19.41
TOTAL RAINFALL	(mm)=	40.15	40.15 40.15
RUNOFF COEFFICIENT	=	0.95	0.22 0.48

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0110):	0.71	0.050	3.23	19.41
	+ ID2= 2 (0120):	0.11	0.016	3.23	31.40
	ID = 3 (0122):	0.82	0.065	3.23	21.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

SCS 6 hr_Exsting Conditions

CALIB	
STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.41	3.167	62.63	4.73	3.21
0.067	0.00	1.633	2.41	3.200	62.63	4.77	2.81
0.100	0.00	1.667	2.41	3.233	62.63	4.80	2.41
0.133	0.00	1.700	2.41	3.267	35.74	4.83	2.41
0.167	0.00	1.733	2.41	3.300	8.83	4.87	2.41
0.200	0.00	1.767	3.21	3.333	8.83	4.90	2.41
0.233	0.00	1.800	4.02	3.367	8.83	4.93	2.41
0.267	0.80	1.833	4.02	3.400	8.83	4.97	2.41
0.300	1.61	1.867	4.02	3.433	8.83	5.00	2.41
0.333	1.61	1.900	4.02	3.467	8.83	5.03	2.41
0.367	1.61	1.933	4.02	3.500	8.83	5.07	2.41
0.400	1.61	1.967	4.02	3.533	8.83	5.10	2.41
0.433	1.61	2.000	4.02	3.567	8.83	5.13	2.41
0.467	1.61	2.033	4.01	3.600	8.83	5.17	2.41
0.500	1.61	2.067	4.02	3.633	8.83	5.20	2.41
0.533	1.61	2.100	4.02	3.667	8.83	5.23	2.41
0.567	1.61	2.133	4.02	3.700	8.83	5.27	2.01
0.600	1.61	2.167	4.02	3.733	8.83	5.30	1.61
0.633	1.61	2.200	4.02	3.767	6.42	5.33	1.61
0.667	1.61	2.233	4.02	3.800	4.02	5.37	1.61
0.700	1.61	2.267	4.42	3.833	4.02	5.40	1.61
0.733	1.61	2.300	4.82	3.867	4.02	5.43	1.61
0.767	2.01	2.333	4.82	3.900	4.02	5.47	1.61
0.800	2.41	2.367	4.82	3.933	4.02	5.50	1.61
0.833	2.41	2.400	4.82	3.967	4.02	5.53	1.61
0.867	2.41	2.433	4.82	4.000	4.02	5.57	1.61
0.900	2.41	2.467	4.82	4.033	4.01	5.60	1.61
0.933	2.41	2.500	4.82	4.067	4.02	5.63	1.61
0.967	2.41	2.533	4.82	4.100	4.02	5.67	1.61
1.000	2.41	2.567	4.82	4.133	4.02	5.70	1.61
1.033	2.41	2.600	4.82	4.167	4.02	5.73	1.61
1.067	2.41	2.633	4.82	4.200	4.02	5.77	1.61
1.100	2.41	2.667	4.82	4.233	4.02	5.80	1.61
1.133	2.41	2.700	4.82	4.267	3.61	5.83	1.61
1.167	2.41	2.733	4.82	4.300	3.21	5.87	1.61
1.200	2.41	2.767	14.45	4.333	3.21	5.90	1.61
1.233	2.41	2.800	24.09	4.367	3.21	5.93	1.61
1.267	2.41	2.833	24.09	4.400	3.21	5.97	1.61
1.300	2.41	2.867	24.09	4.433	3.21	6.00	1.61
1.333	2.41	2.900	24.09	4.467	3.21	6.03	1.61
1.367	2.41	2.933	24.09	4.500	3.21	6.07	1.61
1.400	2.41	2.967	24.09	4.533	3.21	6.10	1.61
1.433	2.41	3.000	24.09	4.567	3.21	6.13	1.61
1.467	2.41	3.033	62.63	4.600	3.21	6.17	1.61
1.500	2.41	3.067	62.63	4.633	3.21	6.20	1.61
1.533	2.41	3.100	62.63	4.667	3.21	6.23	1.61
1.567	2.41	3.133	62.63	4.700	3.21	6.27	0.80

			TOTALS
Max.Eff.Inten.(mm/hr)=		62.63	10.66
over (min)		5.00	10.00
Storage Coeff. (min)=		1.92 (ii)	9.90 (ii)
Unit Hyd. Tpeak (min)=		4.00	10.00
Unit Hyd. peak (cms)=		0.42	0.11
PEAK FLOW	(cms)=	0.03	0.00 0.031 (iii)
TIME TO PEAK	(hrs)=	3.23	3.33 3.23
RUNOFF VOLUME	(mm)=	38.15	5.64 23.18
TOTAL RAINFALL	(mm)=	40.15	40.15 40.15
RUNOFF COEFFICIENT	=	0.95	0.14 0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.41	3.167	62.63	4.73	3.21
0.067	0.00	1.633	2.41	3.200	62.63	4.77	2.81
0.100	0.00	1.667	2.41	3.233	62.63	4.80	2.41
0.133	0.00	1.700	2.41	3.267	35.74	4.83	2.41
0.167	0.00	1.733	2.41	3.300	8.83	4.87	2.41
0.200	0.00	1.767	3.21	3.333	8.83	4.90	2.41
0.233	0.00	1.800	4.02	3.367	8.83	4.93	2.41
0.267	0.80	1.833	4.02	3.400	8.83	4.97	2.41
0.300	1.61	1.867	4.02	3.433	8.83	5.00	2.41
0.333	1.61	1.900	4.02	3.467	8.83	5.03	2.41
0.367	1.61	1.933	4.02	3.500	8.83	5.07	2.41
0.400	1.61	1.967	4.02	3.533	8.83	5.10	2.41
0.433	1.61	2.000	4.02	3.567	8.83	5.13	2.41
0.467	1.61	2.033	4.01	3.600	8.83	5.17	2.41
0.500	1.61	2.067	4.02	3.633	8.83	5.20	2.41
0.533	1.61	2.100	4.02	3.667	8.83	5.23	2.41
0.567	1.61	2.133	4.02	3.700	8.83	5.27	2.01
0.600	1.61	2.167	4.02	3.733	8.83	5.30	1.61
0.633	1.61	2.200	4.02	3.767	6.42	5.33	1.61
0.667	1.61	2.233	4.02	3.800	4.02	5.37	1.61
0.700	1.61	2.267	4.42	3.833	4.02	5.40	1.61
0.733	1.61	2.300	4.82	3.867	4.02	5.43	1.61
0.767	2.01	2.333	4.82	3.900	4.02	5.47	1.61
0.800	2.41	2.367	4.82	3.933	4.02	5.50	1.61
0.833	2.41	2.400	4.82	3.967	4.02	5.53	1.61
0.867	2.41	2.433	4.82	4.000	4.02	5.57	1.61
0.900	2.41	2.467	4.82	4.033	4.01	5.60	1.61
0.933	2.41	2.500	4.82	4.067	4.02	5.63	1.61
0.967	2.41	2.533	4.82	4.100	4.02	5.67	1.61
1.000	2.41	2.567	4.82	4.133	4.02	5.70	1.61
1.033	2.41	2.600	4.82	4.167	4.02	5.73	1.61
1.067	2.41	2.633	4.82	4.200	4.02	5.77	1.61
1.100	2.41	2.667	4.82	4.233	4.02	5.80	1.61
1.133	2.41	2.700	4.82	4.267	3.61	5.83	1.61
1.167	2.41	2.733	4.82	4.300	3.21	5.87	1.61
1.200	2.41	2.767	14.45	4.333	3.21	5.90	1.61
1.233	2.41	2.800	24.09	4.367	3.21	5.93	1.61
1.267	2.41	2.833	24.09	4.400	3.21	5.97	1.61
1.300	2.41	2.867	24.09	4.433	3.21	6.00	1.61
1.333	2.41	2.900	24.09	4.467	3.21	6.03	1.61
1.367	2.41	2.933	24.09	4.500	3.21	6.07	1.61
1.400	2.41	2.967	24.09	4.533	3.21	6.10	1.61
1.433	2.41	3.000	24.09	4.567	3.21	6.13	1.61
1.467	2.41	3.033	62.63	4.600	3.21	6.17	1.61
1.500	2.41	3.067	62.63	4.633	3.21	6.20	1.61
1.533	2.41	3.100	62.63	4.667	3.21	6.23	1.61
1.567	2.41	3.133	62.63	4.700	3.21	6.27	0.80

Max.Eff.Inten.(mm/hr)=	62.63	10.66	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.97 (ii)	7.81 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.41	0.14	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.044 (iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23
RUNOFF VOLUME (mm)=	38.15	5.64	29.04
TOTAL RAINFALL (mm)=	40.15	40.15	40.15
RUNOFF COEFFICIENT =	0.95	0.14	0.72

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.031	3.23	23.18
+ ID2= 2 (0160):	0.34	0.044	3.23	29.04
ID = 3 (0162):	0.65	0.076	3.23	26.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.065	3.23	21.02
+ ID2= 2 (0162):	0.65	0.076	3.23	26.24
ID = 3 (0167):	1.47	0.141	3.23	23.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

SCS 6 hr_Exsting Conditions

CALIB / STANDHYD (0140) ID= 1 DT= 2.0 min	Area (ha)= 0.11	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.41	3.167	62.63	4.73	3.21
0.067	0.00	1.633	2.41	3.200	62.63	4.77	2.81
0.100	0.00	1.667	2.41	3.233	62.63	4.80	2.41
0.133	0.00	1.700	2.41	3.267	35.74	4.83	2.41
0.167	0.00	1.733	2.41	3.300	8.83	4.87	2.41
0.200	0.00	1.767	3.21	3.333	8.83	4.90	2.41
0.233	0.00	1.800	4.02	3.367	8.83	4.93	2.41
0.267	0.80	1.833	4.02	3.400	8.83	4.97	2.41
0.300	1.61	1.867	4.02	3.433	8.83	5.00	2.41
0.333	1.61	1.900	4.02	3.467	8.83	5.03	2.41
0.367	1.61	1.933	4.02	3.500	8.83	5.07	2.41
0.400	1.61	1.967	4.02	3.533	8.83	5.10	2.41
0.433	1.61	2.000	4.02	3.567	8.83	5.13	2.41
0.467	1.61	2.033	4.01	3.600	8.83	5.17	2.41
0.500	1.61	2.067	4.02	3.633	8.83	5.20	2.41
0.533	1.61	2.100	4.02	3.667	8.83	5.23	2.41
0.567	1.61	2.133	4.02	3.700	8.83	5.27	2.01
0.600	1.61	2.167	4.02	3.733	8.83	5.30	1.61
0.633	1.61	2.200	4.02	3.767	6.42	5.33	1.61
0.667	1.61	2.233	4.02	3.800	4.02	5.37	1.61
0.700	1.61	2.267	4.42	3.833	4.02	5.40	1.61
0.733	1.61	2.300	4.82	3.867	4.02	5.43	1.61
0.767	2.01	2.333	4.82	3.900	4.02	5.47	1.61
0.800	2.41	2.367	4.82	3.933	4.02	5.50	1.61
0.833	2.41	2.400	4.82	3.967	4.02	5.53	1.61
0.867	2.41	2.433	4.82	4.000	4.02	5.57	1.61
0.900	2.41	2.467	4.82	4.033	4.01	5.60	1.61
0.933	2.41	2.500	4.82	4.067	4.02	5.63	1.61
0.967	2.41	2.533	4.82	4.100	4.02	5.67	1.61
1.000	2.41	2.567	4.82	4.133	4.02	5.70	1.61
1.033	2.41	2.600	4.82	4.167	4.02	5.73	1.61
1.067	2.41	2.633	4.82	4.200	4.02	5.77	1.61
1.100	2.41	2.667	4.82	4.233	4.02	5.80	1.61
1.133	2.41	2.700	4.82	4.267	3.61	5.83	1.61
1.167	2.41	2.733	4.82	4.300	3.21	5.87	1.61
1.200	2.41	2.767	14.45	4.333	3.21	5.90	1.61
1.233	2.41	2.800	24.09	4.367	3.21	5.93	1.61
1.267	2.41	2.833	24.09	4.400	3.21	5.97	1.61
1.300	2.41	2.867	24.09	4.433	3.21	6.00	1.61
1.333	2.41	2.900	24.09	4.467	3.21	6.03	1.61
1.367	2.41	2.933	24.09	4.500	3.21	6.07	1.61
1.400	2.41	2.967	24.09	4.533	3.21	6.10	1.61
1.433	2.41	3.000	24.09	4.567	3.21	6.13	1.61
1.467	2.41	3.033	62.63	4.600	3.21	6.17	1.61
1.500	2.41	3.067	62.63	4.633	3.21	6.20	1.61
1.533	2.41	3.100	62.63	4.667	3.21	6.23	1.61
1.567	2.41	3.133	62.63	4.700	3.21	6.27	0.80

Max.Eff.Inten.(mm/hr)=	62.63	10.66	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.41 (ii)	6.77 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.16	
			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.015 (iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23
RUNOFF VOLUME (mm)=	38.15	5.64	30.33
TOTAL RAINFALL (mm)=	40.15	40.15	40.15
RUNOFF COEFFICIENT =	0.95	0.14	0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
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       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O
        OOO     T      T    H   H    Y    M  M   OOO
Developed and Distributed by Smart City Water Inc
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\88599589-4c34-42e5-9891-e256c6832f56\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\88599589-4c34-42e5-9891-e256c6832f56\sc

DATE: 01-16-2026 TIME: 04:28:40

USER:

COMMENTS: _____

** SIMULATION : 6hr SCS 50yr **

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\15a0ef31-42bd-44d7-a726-d69de60405b3\a56b1160
Ptotal= 73.46 mm	Comments: 6hr SCS 50yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	7.35	3.50	16.16	5.25	2.94
0.25	2.94	2.00	7.35	3.75	7.35	5.50	2.94
0.50	2.94	2.25	8.82	4.00	7.35	5.75	2.94
0.75	4.41	2.50	8.82	4.25	5.88	6.00	2.94
1.00	4.41	2.75	44.08	4.50	5.88		
1.25	4.41	3.00	114.60	4.75	4.41		
1.50	4.41	3.25	16.16	5.00	4.41		

CALIB	Area (ha)= 0.11
STANDHYD (0120)	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00
ID= 1 DT= 2.0 min	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.41	3.167	114.60	4.73	5.88
0.067	0.00	1.633	4.41	3.200	114.60	4.77	5.14
0.100	0.00	1.667	4.41	3.233	114.60	4.80	4.41
0.133	0.00	1.700	4.41	3.267	65.38	4.83	4.41
0.167	0.00	1.733	4.41	3.300	16.16	4.87	4.41
0.200	0.00	1.767	5.88	3.333	16.16	4.90	4.41
0.233	0.00	1.800	7.35	3.367	16.16	4.93	4.41
0.267	1.47	1.833	7.35	3.400	16.16	4.97	4.41
0.300	2.94	1.867	7.35	3.433	16.16	5.00	4.41
0.333	2.94	1.900	7.35	3.467	16.16	5.03	4.41
0.367	2.94	1.933	7.35	3.500	16.16	5.07	4.41
0.400	2.94	1.967	7.35	3.533	16.16	5.10	4.41
0.433	2.94	2.000	7.35	3.567	16.16	5.13	4.41
0.467	2.94	2.033	7.35	3.600	16.16	5.17	4.41
0.500	2.94	2.067	7.35	3.633	16.16	5.20	4.41
0.533	2.94	2.100	7.35	3.667	16.16	5.23	4.41
0.567	2.94	2.133	7.35	3.700	16.16	5.27	3.67
0.600	2.94	2.167	7.35	3.733	16.16	5.30	2.94
0.633	2.94	2.200	7.35	3.767	11.75	5.33	2.94
0.667	2.94	2.233	7.35	3.800	7.35	5.37	2.94
0.700	2.94	2.267	8.08	3.833	7.35	5.40	2.94
0.733	2.94	2.300	8.82	3.867	7.35	5.43	2.94
0.767	3.67	2.333	8.82	3.900	7.35	5.47	2.94
0.800	4.41	2.367	8.82	3.933	7.35	5.50	2.94
0.833	4.41	2.400	8.82	3.967	7.35	5.53	2.94
0.867	4.41	2.433	8.82	4.000	7.35	5.57	2.94
0.900	4.41	2.467	8.82	4.033	7.35	5.60	2.94
0.933	4.41	2.500	8.82	4.067	7.35	5.63	2.94
0.967	4.41	2.533	8.82	4.100	7.35	5.67	2.94
1.000	4.41	2.567	8.82	4.133	7.35	5.70	2.94
1.033	4.41	2.600	8.82	4.167	7.35	5.73	2.94
1.067	4.41	2.633	8.82	4.200	7.35	5.77	2.94
1.100	4.41	2.667	8.82	4.233	7.35	5.80	2.94
1.133	4.41	2.700	8.82	4.267	6.61	5.83	2.94
1.167	4.41	2.733	8.82	4.300	5.88	5.87	2.94
1.200	4.41	2.767	26.44	4.333	5.88	5.90	2.94
1.233	4.41	2.800	44.08	4.367	5.88	5.93	2.94
1.267	4.41	2.833	44.08	4.400	5.88	5.97	2.94
1.300	4.41	2.867	44.08	4.433	5.88	6.00	2.94
1.333	4.41	2.900	44.08	4.467	5.88	6.03	2.94
1.367	4.41	2.933	44.08	4.500	5.88	6.07	2.94
1.400	4.41	2.967	44.08	4.533	5.88	6.10	2.94
1.433	4.41	3.000	44.08	4.567	5.88	6.13	2.94
1.467	4.41	3.033	114.59	4.600	5.88	6.17	2.94
1.500	4.41	3.067	114.60	4.633	5.88	6.20	2.94
1.533	4.41	3.100	114.60	4.667	5.88	6.23	2.94
1.567	4.41	3.133	114.60	4.700	5.88	6.27	1.47

Max.Eff.Inten.(mm/hr)=		114.60	52.19	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.10 (ii)	5.23 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.50	0.20	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.030 (iii)
TIME TO PEAK	(hrs)=	3.23	3.27	3.23
RUNOFF VOLUME	(mm)=	71.46	27.22	61.26
TOTAL RAINFALL	(mm)=	73.46	73.46	73.46
RUNOFF COEFFICIENT	=	0.97	0.37	0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)= 0.71
STANDHYD (0110)	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00
ID= 1 DT= 2.0 min	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.41	3.167	114.60	4.73	5.88
0.067	0.00	1.633	4.41	3.200	114.60	4.77	5.14
0.100	0.00	1.667	4.41	3.233	114.60	4.80	4.41
0.133	0.00	1.700	4.41	3.267	65.38	4.83	4.41
0.167	0.00	1.733	4.41	3.300	16.16	4.87	4.41
0.200	0.00	1.767	5.88	3.333	16.16	4.90	4.41
0.233	0.00	1.800	7.35	3.367	16.16	4.93	4.41
0.267	1.47	1.833	7.35	3.400	16.16	4.97	4.41
0.300	2.94	1.867	7.35	3.433	16.16	5.00	4.41
0.333	2.94	1.900	7.35	3.467	16.16	5.03	4.41
0.367	2.94	1.933	7.35	3.500	16.16	5.07	4.41
0.400	2.94	1.967	7.35	3.533	16.16	5.10	4.41
0.433	2.94	2.000	7.35	3.567	16.16	5.13	4.41
0.467	2.94	2.033	7.35	3.600	16.16	5.17	4.41
0.500	2.94	2.067	7.35	3.633	16.16	5.20	4.41
0.533	2.94	2.100	7.35	3.667	16.16	5.23	4.41
0.567	2.94	2.133	7.35	3.700	16.16	5.27	3.67
0.600	2.94	2.167	7.35	3.733	16.16	5.30	2.94
0.633	2.94	2.200	7.35	3.767	11.75	5.33	2.94
0.667	2.94	2.233	7.35	3.800	7.35	5.37	2.94
0.700	2.94	2.267	8.08	3.833	7.35	5.40	2.94
0.733	2.94	2.300	8.82	3.867	7.35	5.43	2.94
0.767	3.67	2.333	8.82	3.900	7.35	5.47	2.94
0.800	4.41	2.367	8.82	3.933	7.35	5.50	2.94
0.833	4.41	2.400	8.82	3.967	7.35	5.53	2.94
0.867	4.41	2.433	8.82	4.000	7.35	5.57	2.94
0.900	4.41	2.467	8.82	4.033	7.35	5.60	2.94
0.933	4.41	2.500	8.82	4.067	7.35	5.63	2.94
0.967	4.41	2.533	8.82	4.100	7.35	5.67	2.94
1.000	4.41	2.567	8.82	4.133	7.35	5.70	2.94
1.033	4.41	2.600	8.82	4.167	7.35	5.73	2.94
1.067	4.41	2.633	8.82	4.200	7.35	5.77	2.94
1.100	4.41	2.667	8.82	4.233	7.35	5.80	2.94
1.133	4.41	2.700	8.82	4.267	6.61	5.83	2.94
1.167	4.41	2.733	8.82	4.300	5.88	5.87	2.94
1.200	4.41	2.767	26.44	4.333	5.88	5.90	2.94

1.233	4.41	2.800	44.08	4.367	5.88	5.93	2.94
1.267	4.41	2.833	44.08	4.400	5.88	5.97	2.94
1.300	4.41	2.867	44.08	4.433	5.88	6.00	2.94
1.333	4.41	2.900	44.08	4.467	5.88	6.03	2.94
1.367	4.41	2.933	44.08	4.500	5.88	6.07	2.94
1.400	4.41	2.967	44.08	4.533	5.88	6.10	2.94
1.433	4.41	3.000	44.08	4.567	5.88	6.13	2.94
1.467	4.41	3.033	114.59	4.600	5.88	6.17	2.94
1.500	4.41	3.067	114.60	4.633	5.88	6.20	2.94
1.533	4.41	3.100	114.60	4.667	5.88	6.23	2.94
1.567	4.41	3.133	114.60	4.700	5.88	6.27	1.47

Max.Eff.Inten.(mm/hr)=		114.60	52.19	
over (min)		5.00	12.00	
Storage Coeff. (min)=		1.93 (ii)	11.09 (ii)	
Unit Hyd. Tpeak (min)=		4.00	12.00	
Unit Hyd. peak (cms)=		0.41	0.10	
				TOTALS
PEAK FLOW	(cms)=	0.08	0.04	0.115 (iii)
TIME TO PEAK	(hrs)=	3.23	3.33	3.23
RUNOFF VOLUME	(mm)=	71.46	27.22	43.14
TOTAL RAINFALL	(mm)=	73.46	73.46	73.46
RUNOFF COEFFICIENT	=	0.97	0.37	0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.115	3.23	43.14
+ ID2= 2 (0120):		0.11	0.030	3.23	61.26
ID = 3 (0122):		0.82	0.146	3.23	45.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)=	0.31	
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)= 54.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.17	0.14
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	45.46	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.41	3.167	114.60	4.73	5.88
0.067	0.00	1.633	4.41	3.200	114.60	4.77	5.14
0.100	0.00	1.667	4.41	3.233	114.60	4.80	4.41
0.133	0.00	1.700	4.41	3.267	65.38	4.83	4.41
0.167	0.00	1.733	4.41	3.300	16.16	4.87	4.41
0.200	0.00	1.767	5.88	3.333	16.16	4.90	4.41
0.233	0.00	1.800	7.35	3.367	16.16	4.93	4.41
0.267	1.47	1.833	7.35	3.400	16.16	4.97	4.41
0.300	2.94	1.867	7.35	3.433	16.16	5.00	4.41
0.333	2.94	1.900	7.35	3.467	16.16	5.03	4.41
0.367	2.94	1.933	7.35	3.500	16.16	5.07	4.41
0.400	2.94	1.967	7.35	3.533	16.16	5.10	4.41
0.433	2.94	2.000	7.35	3.567	16.16	5.13	4.41
0.467	2.94	2.033	7.35	3.600	16.16	5.17	4.41
0.500	2.94	2.067	7.35	3.633	16.16	5.20	4.41
0.533	2.94	2.100	7.35	3.667	16.16	5.23	4.41
0.567	2.94	2.133	7.35	3.700	16.16	5.27	3.67
0.600	2.94	2.167	7.35	3.733	16.16	5.30	2.94
0.633	2.94	2.200	7.35	3.767	11.75	5.33	2.94
0.667	2.94	2.233	7.35	3.800	7.35	5.37	2.94
0.700	2.94	2.267	8.08	3.833	7.35	5.40	2.94
0.733	2.94	2.300	8.82	3.867	7.35	5.43	2.94
0.767	3.67	2.333	8.82	3.900	7.35	5.47	2.94
0.800	4.41	2.367	8.82	3.933	7.35	5.50	2.94
0.833	4.41	2.400	8.82	3.967	7.35	5.53	2.94
0.867	4.41	2.433	8.82	4.000	7.35	5.57	2.94
0.900	4.41	2.467	8.82	4.033	7.35	5.60	2.94
0.933	4.41	2.500	8.82	4.067	7.35	5.63	2.94
0.967	4.41	2.533	8.82	4.100	7.35	5.67	2.94
1.000	4.41	2.567	8.82	4.133	7.35	5.70	2.94
1.033	4.41	2.600	8.82	4.167	7.35	5.73	2.94
1.067	4.41	2.633	8.82	4.200	7.35	5.77	2.94
1.100	4.41	2.667	8.82	4.233	7.35	5.80	2.94
1.133	4.41	2.700	8.82	4.267	6.61	5.83	2.94
1.167	4.41	2.733	8.82	4.300	5.88	5.87	2.94

1.200	4.41	2.767	26.44	4.333	5.88	5.90	2.94
1.233	4.41	2.800	44.08	4.367	5.88	5.93	2.94
1.267	4.41	2.833	44.08	4.400	5.88	5.97	2.94
1.300	4.41	2.867	44.08	4.433	5.88	6.00	2.94
1.333	4.41	2.900	44.08	4.467	5.88	6.03	2.94
1.367	4.41	2.933	44.08	4.500	5.88	6.07	2.94
1.400	4.41	2.967	44.08	4.533	5.88	6.10	2.94
1.433	4.41	3.000	44.08	4.567	5.88	6.13	2.94
1.467	4.41	3.033	114.59	4.600	5.88	6.17	2.94
1.500	4.41	3.067	114.60	4.633	5.88	6.20	2.94
1.533	4.41	3.100	114.60	4.667	5.88	6.23	2.94
1.567	4.41	3.133	114.60	4.700	5.88	6.27	1.47

Max.Eff.Inten.(mm/hr)=		114.60	35.14	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.51 (ii)	7.78 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.46	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.01	0.063 (iii)
TIME TO PEAK	(hrs)=	3.23	3.30	3.23
RUNOFF VOLUME	(mm)=	71.46	18.57	47.11
TOTAL RAINFALL	(mm)=	73.46	73.46	73.46
RUNOFF COEFFICIENT	=	0.97	0.25	0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)=	0.34	
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.24	0.10
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	47.61	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.41	3.167	114.60	4.73	5.88
0.067	0.00	1.633	4.41	3.200	114.60	4.77	5.14
0.100	0.00	1.667	4.41	3.233	114.60	4.80	4.41
0.133	0.00	1.700	4.41	3.267	65.38	4.83	4.41
0.167	0.00	1.733	4.41	3.300	16.16	4.87	4.41
0.200	0.00	1.767	5.88	3.333	16.16	4.90	4.41
0.233	0.00	1.800	7.35	3.367	16.16	4.93	4.41
0.267	1.47	1.833	7.35	3.400	16.16	4.97	4.41
0.300	2.94	1.867	7.35	3.433	16.16	5.00	4.41
0.333	2.94	1.900	7.35	3.467	16.16	5.03	4.41
0.367	2.94	1.933	7.35	3.500	16.16	5.07	4.41
0.400	2.94	1.967	7.35	3.533	16.16	5.10	4.41
0.433	2.94	2.000	7.35	3.567	16.16	5.13	4.41
0.467	2.94	2.033	7.35	3.600	16.16	5.17	4.41
0.500	2.94	2.067	7.35	3.633	16.16	5.20	4.41
0.533	2.94	2.100	7.35	3.667	16.16	5.23	4.41
0.567	2.94	2.133	7.35	3.700	16.16	5.27	3.67
0.600	2.94	2.167	7.35	3.733	16.16	5.30	2.94
0.633	2.94	2.200	7.35	3.767	11.75	5.33	2.94
0.667	2.94	2.233	7.35	3.800	7.35	5.37	2.94
0.700	2.94	2.267	8.08	3.833	7.35	5.40	2.94
0.733	2.94	2.300	8.82	3.867	7.35	5.43	2.94
0.767	3.67	2.333	8.82	3.900	7.35	5.47	2.94
0.800	4.41	2.367	8.82	3.933	7.35	5.50	2.94
0.833	4.41	2.400	8.82	3.967	7.35	5.53	2.94
0.867	4.41	2.433	8.82	4.000	7.35	5.57	2.94
0.900	4.41	2.467	8.82	4.033	7.35	5.60	2.94
0.933	4.41	2.500	8.82	4.067	7.35	5.63	2.94
0.967	4.41	2.533	8.82	4.100	7.35	5.67	2.94
1.000	4.41	2.567	8.82	4.133	7.35	5.70	2.94
1.033	4.41	2.600	8.82	4.167	7.35	5.73	2.94
1.067	4.41	2.633	8.82	4.200	7.35	5.77	2.94
1.100	4.41	2.667	8.82	4.233	7.35	5.80	2.94
1.133	4.41	2.700	8.82	4.267	6.61	5.83	2.94
1.167	4.41	2.733	8.82	4.300	5.88	5.87	2.94
1.200	4.41	2.767	26.44	4.333	5.88	5.90	2.94
1.233	4.41	2.800	44.08	4.367	5.88	5.93	2.94
1.267	4.41	2.833	44.08	4.400	5.88	5.97	2.94
1.300	4.41	2.867	44.08	4.433	5.88	6.00	2.94
1.333	4.41	2.900	44.08	4.467	5.88	6.03	2.94
1.367	4.41	2.933	44.08	4.500	5.88	6.07	2.94
1.400	4.41	2.967	44.08	4.533	5.88	6.10	2.94
1.433	4.41	3.000	44.08	4.567	5.88	6.13	2.94
1.467	4.41	3.033	114.59	4.600	5.88	6.17	2.94
1.500	4.41	3.067	114.60	4.633	5.88	6.20	2.94
1.533	4.41	3.100	114.60	4.667	5.88	6.23	2.94

	1.567	4.41	3.133	114.60	4.700	5.88	6.27	1.47

Max.Eff.Inten.(mm/hr)=	114.60	35.14	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.55 (ii)	6.13 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.45	0.17	
			TOTALS
PEAK FLOW (cms)=	0.08	0.01	0.085 (iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23
RUNOFF VOLUME (mm)=	71.46	18.57	56.64
TOTAL RAINFALL (mm)=	73.46	73.46	73.46
RUNOFF COEFFICIENT =	0.97	0.25	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):	0.31	0.063	3.23	47.11
+ ID2= 2 (0160):	0.34	0.085	3.23	56.64
ID = 3 (0162):	0.65	0.148	3.23	52.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):	0.82	0.146	3.23	45.57
+ ID2= 2 (0162):	0.65	0.148	3.23	52.10
ID = 3 (0167):	1.47	0.294	3.23	48.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

STANDHYD (0140)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	4.41	3.167	114.60	4.73	5.88
0.067	0.00	1.633	4.41	3.200	114.60	4.77	5.14
0.100	0.00	1.667	4.41	3.233	114.60	4.80	4.41
0.133	0.00	1.700	4.41	3.267	65.38	4.83	4.41
0.167	0.00	1.733	4.41	3.300	16.16	4.87	4.41
0.200	0.00	1.767	5.88	3.333	16.16	4.90	4.41
0.233	0.00	1.800	7.35	3.367	16.16	4.93	4.41
0.267	1.47	1.833	7.35	3.400	16.16	4.97	4.41
0.300	2.94	1.867	7.35	3.433	16.16	5.00	4.41
0.333	2.94	1.900	7.35	3.467	16.16	5.03	4.41
0.367	2.94	1.933	7.35	3.500	16.16	5.07	4.41
0.400	2.94	1.967	7.35	3.533	16.16	5.10	4.41
0.433	2.94	2.000	7.35	3.567	16.16	5.13	4.41
0.467	2.94	2.033	7.35	3.600	16.16	5.17	4.41
0.500	2.94	2.067	7.35	3.633	16.16	5.20	4.41
0.533	2.94	2.100	7.35	3.667	16.16	5.23	4.41
0.567	2.94	2.133	7.35	3.700	16.16	5.27	3.67
0.600	2.94	2.167	7.35	3.733	16.16	5.30	2.94
0.633	2.94	2.200	7.35	3.767	11.75	5.33	2.94
0.667	2.94	2.233	7.35	3.800	7.35	5.37	2.94
0.700	2.94	2.267	8.08	3.833	7.35	5.40	2.94
0.733	2.94	2.300	8.82	3.867	7.35	5.43	2.94
0.767	3.67	2.333	8.82	3.900	7.35	5.47	2.94
0.800	4.41	2.367	8.82	3.933	7.35	5.50	2.94
0.833	4.41	2.400	8.82	3.967	7.35	5.53	2.94
0.867	4.41	2.433	8.82	4.000	7.35	5.57	2.94
0.900	4.41	2.467	8.82	4.033	7.35	5.60	2.94
0.933	4.41	2.500	8.82	4.067	7.35	5.63	2.94
0.967	4.41	2.533	8.82	4.100	7.35	5.67	2.94
1.000	4.41	2.567	8.82	4.133	7.35	5.70	2.94
1.033	4.41	2.600	8.82	4.167	7.35	5.73	2.94
1.067	4.41	2.633	8.82	4.200	7.35	5.77	2.94
1.100	4.41	2.667	8.82	4.233	7.35	5.80	2.94

	1.133	4.41	2.700	8.82	4.267	6.61	5.83	2.94
	1.167	4.41	2.733	8.82	4.300	5.88	5.87	2.94
	1.200	4.41	2.767	26.44	4.333	5.88	5.90	2.94
	1.233	4.41	2.800	44.08	4.367	5.88	5.93	2.94
	1.267	4.41	2.833	44.08	4.400	5.88	5.97	2.94
	1.300	4.41	2.867	44.08	4.433	5.88	6.00	2.94
	1.333	4.41	2.900	44.08	4.467	5.88	6.03	2.94
	1.367	4.41	2.933	44.08	4.500	5.88	6.07	2.94
	1.400	4.41	2.967	44.08	4.533	5.88	6.10	2.94
	1.433	4.41	3.000	44.08	4.567	5.88	6.13	2.94
	1.467	4.41	3.033	114.59	4.600	5.88	6.17	2.94
	1.500	4.41	3.067	114.60	4.633	5.88	6.20	2.94
	1.533	4.41	3.100	114.60	4.667	5.88	6.23	2.94
	1.567	4.41	3.133	114.60	4.700	5.88	6.27	1.47

Max.Eff.Inten.(mm/hr)=	114.60	35.14	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.10 (ii)	5.32 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK (hrs)=	3.23	3.27	3.23
RUNOFF VOLUME (mm)=	71.46	18.57	58.75
TOTAL RAINFALL (mm)=	73.46	73.46	73.46
RUNOFF COEFFICIENT =	0.97	0.25	0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

  OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
 O   O    T      T    H   H   Y Y   MM MM  O   O
 O   O    T      T    H   H    Y    M   M  O   O
  OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\54319556-4c9d-42a2-8919-31aa6f1848b2\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\54319556-4c9d-42a2-8919-31aa6f1848b2\sc

DATE: 01-16-2026 TIME: 04:28:40

USER:

COMMENTS: _____

```
**********************************************
** SIMULATION : 6hr SCS 5yr                  **
**********************************************
```

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\15a0ef31-42bd-44d7-a726-d69de60405b3\8c122c1a
Ptotal= 48.76 mm	Comments: 6hr SCS 5yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	1.75	4.88	3.50	10.73	5.25	1.95
0.25	1.95	2.00	4.88	3.75	4.88	5.50	1.95
0.50	1.95	2.25	5.85	4.00	4.88	5.75	1.95
0.75	2.93	2.50	5.85	4.25	3.90	6.00	1.95
1.00	2.93	2.75	29.26	4.50	3.90		
1.25	2.93	3.00	76.07	4.75	2.93		
1.50	2.93	3.25	10.73	5.00	2.93		

CALIB									
STANDHYD (0120)	Area (ha)= 0.11								
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00	Dir. Conn.(%)= 77.00							

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.93	3.167	76.07	4.73	3.90
0.067	0.00	1.633	2.93	3.200	76.07	4.77	3.41
0.100	0.00	1.667	2.93	3.233	76.07	4.80	2.93
0.133	0.00	1.700	2.93	3.267	43.40	4.83	2.93
0.167	0.00	1.733	2.93	3.300	10.73	4.87	2.93
0.200	0.00	1.767	3.90	3.333	10.73	4.90	2.93
0.233	0.00	1.800	4.88	3.367	10.73	4.93	2.93
0.267	0.98	1.833	4.88	3.400	10.73	4.97	2.93
0.300	1.95	1.867	4.88	3.433	10.73	5.00	2.93
0.333	1.95	1.900	4.88	3.467	10.73	5.03	2.93
0.367	1.95	1.933	4.88	3.500	10.73	5.07	2.93
0.400	1.95	1.967	4.88	3.533	10.73	5.10	2.93
0.433	1.95	2.000	4.88	3.567	10.73	5.13	2.93
0.467	1.95	2.033	4.88	3.600	10.73	5.17	2.93
0.500	1.95	2.067	4.88	3.633	10.73	5.20	2.93
0.533	1.95	2.100	4.88	3.667	10.73	5.23	2.93
0.567	1.95	2.133	4.88	3.700	10.73	5.27	2.44
0.600	1.95	2.167	4.88	3.733	10.73	5.30	1.95
0.633	1.95	2.200	4.88	3.767	7.80	5.33	1.95
0.667	1.95	2.233	4.88	3.800	4.88	5.37	1.95
0.700	1.95	2.267	5.36	3.833	4.88	5.40	1.95
0.733	1.95	2.300	5.85	3.867	4.88	5.43	1.95
0.767	2.44	2.333	5.85	3.900	4.88	5.47	1.95
0.800	2.93	2.367	5.85	3.933	4.88	5.50	1.95
0.833	2.93	2.400	5.85	3.967	4.88	5.53	1.95
0.867	2.93	2.433	5.85	4.000	4.88	5.57	1.95
0.900	2.93	2.467	5.85	4.033	4.88	5.60	1.95
0.933	2.93	2.500	5.85	4.067	4.88	5.63	1.95
0.967	2.93	2.533	5.85	4.100	4.88	5.67	1.95
1.000	2.93	2.567	5.85	4.133	4.88	5.70	1.95
1.033	2.93	2.600	5.85	4.167	4.88	5.73	1.95
1.067	2.93	2.633	5.85	4.200	4.88	5.77	1.95
1.100	2.93	2.667	5.85	4.233	4.88	5.80	1.95
1.133	2.93	2.700	5.85	4.267	4.39	5.83	1.95
1.167	2.93	2.733	5.85	4.300	3.90	5.87	1.95
1.200	2.93	2.767	17.55	4.333	3.90	5.90	1.95
1.233	2.93	2.800	29.26	4.367	3.90	5.93	1.95
1.267	2.93	2.833	29.26	4.400	3.90	5.97	1.95
1.300	2.93	2.867	29.26	4.433	3.90	6.00	1.95
1.333	2.93	2.900	29.26	4.467	3.90	6.03	1.95
1.367	2.93	2.933	29.26	4.500	3.90	6.07	1.95
1.400	2.93	2.967	29.26	4.533	3.90	6.10	1.95
1.433	2.93	3.000	29.26	4.567	3.90	6.13	1.95
1.467	2.93	3.033	76.06	4.600	3.90	6.17	1.95
1.500	2.93	3.067	76.07	4.633	3.90	6.20	1.95
1.533	2.93	3.100	76.07	4.667	3.90	6.23	1.95
1.567	2.93	3.133	76.07	4.700	3.90	6.27	0.98

Max.Eff.Inten.(mm/hr)=	76.07	24.96		
over (min)	5.00	8.00		
Storage Coeff. (min)=	1.30 (ii)	6.16 (ii)		
Unit Hyd. Tpeak (min)=	4.00	8.00		
Unit Hyd. peak (cms)=	0.48	0.17		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.019	(iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23	
RUNOFF VOLUME (mm)=	46.76	12.98	38.96	
TOTAL RAINFALL (mm)=	48.76	48.76	48.76	
RUNOFF COEFFICIENT =	0.96	0.27	0.80	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB									
STANDHYD (0110)	Area (ha)= 0.71								
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 36.00							

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00

SCS 6 hr_Exsting Conditions

Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.93	3.167	76.07	4.73	3.90
0.067	0.00	1.633	2.93	3.200	76.07	4.77	3.41
0.100	0.00	1.667	2.93	3.233	76.07	4.80	2.93
0.133	0.00	1.700	2.93	3.267	43.40	4.83	2.93
0.167	0.00	1.733	2.93	3.300	10.73	4.87	2.93
0.200	0.00	1.767	3.90	3.333	10.73	4.90	2.93
0.233	0.00	1.800	4.88	3.367	10.73	4.93	2.93
0.267	0.98	1.833	4.88	3.400	10.73	4.97	2.93
0.300	1.95	1.867	4.88	3.433	10.73	5.00	2.93
0.333	1.95	1.900	4.88	3.467	10.73	5.03	2.93
0.367	1.95	1.933	4.88	3.500	10.73	5.07	2.93
0.400	1.95	1.967	4.88	3.533	10.73	5.10	2.93
0.433	1.95	2.000	4.88	3.567	10.73	5.13	2.93
0.467	1.95	2.033	4.88	3.600	10.73	5.17	2.93
0.500	1.95	2.067	4.88	3.633	10.73	5.20	2.93
0.533	1.95	2.100	4.88	3.667	10.73	5.23	2.93
0.567	1.95	2.133	4.88	3.700	10.73	5.27	2.44
0.600	1.95	2.167	4.88	3.733	10.73	5.30	1.95
0.633	1.95	2.200	4.88	3.767	7.80	5.33	1.95
0.667	1.95	2.233	4.88	3.800	4.88	5.37	1.95
0.700	1.95	2.267	5.36	3.833	4.88	5.40	1.95
0.733	1.95	2.300	5.85	3.867	4.88	5.43	1.95
0.767	2.44	2.333	5.85	3.900	4.88	5.47	1.95
0.800	2.93	2.367	5.85	3.933	4.88	5.50	1.95
0.833	2.93	2.400	5.85	3.967	4.88	5.53	1.95
0.867	2.93	2.433	5.85	4.000	4.88	5.57	1.95
0.900	2.93	2.467	5.85	4.033	4.88	5.60	1.95
0.933	2.93	2.500	5.85	4.067	4.88	5.63	1.95
0.967	2.93	2.533	5.85	4.100	4.88	5.67	1.95
1.000	2.93	2.567	5.85	4.133	4.88	5.70	1.95
1.033	2.93	2.600	5.85	4.167	4.88	5.73	1.95
1.067	2.93	2.633	5.85	4.200	4.88	5.77	1.95
1.100	2.93	2.667	5.85	4.233	4.88	5.80	1.95
1.133	2.93	2.700	5.85	4.267	4.39	5.83	1.95
1.167	2.93	2.733	5.85	4.300	3.90	5.87	1.95
1.200	2.93	2.767	17.55	4.333	3.90	5.90	1.95
1.233	2.93	2.800	29.26	4.367	3.90	5.93	1.95
1.267	2.93	2.833	29.26	4.400	3.90	5.97	1.95
1.300	2.93	2.867	29.26	4.433	3.90	6.00	1.95

SCS 6 hr_Exsting Conditions

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.333	2.93	2.900	29.26	4.467	3.90	6.03	1.95
1.367	2.93	2.933	29.26	4.500	3.90	6.07	1.95
1.400	2.93	2.967	29.26	4.533	3.90	6.10	1.95
1.433	2.93	3.000	29.26	4.567	3.90	6.13	1.95
1.467	2.93	3.033	76.06	4.600	3.90	6.17	1.95
1.500	2.93	3.067	76.07	4.633	3.90	6.20	1.95
1.533	2.93	3.100	76.07	4.667	3.90	6.23	1.95
1.567	2.93	3.133	76.07	4.700	3.90	6.27	0.98

Max.Eff.Inten.(mm/hr)=	76.07	22.93		
over (min)	5.00	16.00		
Storage Coeff. (min)=	2.28 (ii)	15.00 (ii)		
Unit Hyd. Tpeak (min)=	4.00	16.00		
Unit Hyd. peak (cms)=	0.38	0.07		
			TOTALS	
PEAK FLOW (cms)=	0.05	0.02	0.064	(iii)
TIME TO PEAK (hrs)=	3.23	3.43	3.23	
RUNOFF VOLUME (mm)=	46.76	12.98	25.13	
TOTAL RAINFALL (mm)=	48.76	48.76	48.76	
RUNOFF COEFFICIENT =	0.96	0.27	0.52	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0110):	0.71	0.064	3.23	25.13
+ ID2= 2 (0120):	0.11	0.019	3.23	38.96
ID = 3 (0122):	0.82	0.083	3.23	26.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB									
STANDHYD (0150)	Area (ha)= 0.31								
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00	Dir. Conn.(%)= 54.00							

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00

Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.93	3.167	76.07	4.73	3.90
0.067	0.00	1.633	2.93	3.200	76.07	4.77	3.41
0.100	0.00	1.667	2.93	3.233	76.07	4.80	2.93
0.133	0.00	1.700	2.93	3.267	43.40	4.83	2.93
0.167	0.00	1.733	2.93	3.300	10.73	4.87	2.93
0.200	0.00	1.767	3.90	3.333	10.73	4.90	2.93
0.233	0.00	1.800	4.88	3.367	10.73	4.93	2.93
0.267	0.98	1.833	4.88	3.400	10.73	4.97	2.93
0.300	1.95	1.867	4.88	3.433	10.73	5.00	2.93
0.333	1.95	1.900	4.88	3.467	10.73	5.03	2.93
0.367	1.95	1.933	4.88	3.500	10.73	5.07	2.93
0.400	1.95	1.967	4.88	3.533	10.73	5.10	2.93
0.433	1.95	2.000	4.88	3.567	10.73	5.13	2.93
0.467	1.95	2.033	4.88	3.600	10.73	5.17	2.93
0.500	1.95	2.067	4.88	3.633	10.73	5.20	2.93
0.533	1.95	2.100	4.88	3.667	10.73	5.23	2.93
0.567	1.95	2.133	4.88	3.700	10.73	5.27	2.44
0.600	1.95	2.167	4.88	3.733	10.73	5.30	1.95
0.633	1.95	2.200	4.88	3.767	7.80	5.33	1.95
0.667	1.95	2.233	4.88	3.800	4.88	5.37	1.95
0.700	1.95	2.267	5.36	3.833	4.88	5.40	1.95
0.733	1.95	2.300	5.85	3.867	4.88	5.43	1.95
0.767	2.44	2.333	5.85	3.900	4.88	5.47	1.95
0.800	2.93	2.367	5.85	3.933	4.88	5.50	1.95
0.833	2.93	2.400	5.85	3.967	4.88	5.53	1.95
0.867	2.93	2.433	5.85	4.000	4.88	5.57	1.95
0.900	2.93	2.467	5.85	4.033	4.88	5.60	1.95
0.933	2.93	2.500	5.85	4.067	4.88	5.63	1.95
0.967	2.93	2.533	5.85	4.100	4.88	5.67	1.95
1.000	2.93	2.567	5.85	4.133	4.88	5.70	1.95
1.033	2.93	2.600	5.85	4.167	4.88	5.73	1.95
1.067	2.93	2.633	5.85	4.200	4.88	5.77	1.95
1.100	2.93	2.667	5.85	4.233	4.88	5.80	1.95
1.133	2.93	2.700	5.85	4.267	4.39	5.83	1.95
1.167	2.93	2.733	5.85	4.300	3.90	5.87	1.95
1.200	2.93	2.767	17.55	4.333	3.90	5.90	1.95
1.233	2.93	2.800	29.26	4.367	3.90	5.93	1.95
1.267	2.93	2.833	29.26	4.400	3.90	5.97	1.95
1.300	2.93	2.867	29.26	4.433	3.90	6.00	1.95

1.333	2.93	2.900	29.26	4.467	3.90	6.03	1.95
1.367	2.93	2.933	29.26	4.500	3.90	6.07	1.95
1.400	2.93	2.967	29.26	4.533	3.90	6.10	1.95
1.433	2.93	3.000	29.26	4.567	3.90	6.13	1.95
1.467	2.93	3.033	76.06	4.600	3.90	6.17	1.95
1.500	2.93	3.067	76.07	4.633	3.90	6.20	1.95
1.533	2.93	3.100	76.07	4.667	3.90	6.23	1.95
1.567	2.93	3.133	76.07	4.700	3.90	6.27	0.98

Max.Eff.Inten.(mm/hr)=	76.07	15.91	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.78 (ii)	9.16 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.43	0.12	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.039 (iii)
TIME TO PEAK (hrs)=	3.23	3.33	3.23
RUNOFF VOLUME (mm)=	46.76	8.41	29.10
TOTAL RAINFALL (mm)=	48.76	48.76	48.76
RUNOFF COEFFICIENT =	0.96	0.17	0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0160)	Area (ha)=	0.34			
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)=	72.00	
		IMPERVIOUS	PERVIOUS (i)		
Surface Area	(ha)=	0.24	0.10		
Dep. Storage	(mm)=	2.00	5.00		
Average Slope	(%)=	1.00	2.00		
Length	(m)=	47.61	40.00		
Mannings n	=	0.013	0.250		

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.93	3.167	76.07	4.73	3.90

0.067	0.00	1.633	2.93	3.200	76.07	4.77	3.41
0.100	0.00	1.667	2.93	3.233	76.07	4.80	2.93
0.133	0.00	1.700	2.93	3.267	43.40	4.83	2.93
0.167	0.00	1.733	2.93	3.300	10.73	4.87	2.93
0.200	0.00	1.767	3.90	3.333	10.73	4.90	2.93
0.233	0.00	1.800	4.88	3.367	10.73	4.93	2.93
0.267	0.98	1.833	4.88	3.400	10.73	4.97	2.93
0.300	1.95	1.867	4.88	3.433	10.73	5.00	2.93
0.333	1.95	1.900	4.88	3.467	10.73	5.03	2.93
0.367	1.95	1.933	4.88	3.500	10.73	5.07	2.93
0.400	1.95	1.967	4.88	3.533	10.73	5.10	2.93
0.433	1.95	2.000	4.88	3.567	10.73	5.13	2.93
0.467	1.95	2.033	4.88	3.600	10.73	5.17	2.93
0.500	1.95	2.067	4.88	3.633	10.73	5.20	2.93
0.533	1.95	2.100	4.88	3.667	10.73	5.23	2.93
0.567	1.95	2.133	4.88	3.700	10.73	5.27	2.44
0.600	1.95	2.167	4.88	3.733	10.73	5.30	1.95
0.633	1.95	2.200	4.88	3.767	7.80	5.33	1.95
0.667	1.95	2.233	4.88	3.800	4.88	5.37	1.95
0.700	1.95	2.267	5.36	3.833	4.88	5.40	1.95
0.733	1.95	2.300	5.85	3.867	4.88	5.43	1.95
0.767	2.44	2.333	5.85	3.900	4.88	5.47	1.95
0.800	2.93	2.367	5.85	3.933	4.88	5.50	1.95
0.833	2.93	2.400	5.85	3.967	4.88	5.53	1.95
0.867	2.93	2.433	5.85	4.000	4.88	5.57	1.95
0.900	2.93	2.467	5.85	4.033	4.88	5.60	1.95
0.933	2.93	2.500	5.85	4.067	4.88	5.63	1.95
0.967	2.93	2.533	5.85	4.100	4.88	5.67	1.95
1.000	2.93	2.567	5.85	4.133	4.88	5.70	1.95
1.033	2.93	2.600	5.85	4.167	4.88	5.73	1.95
1.067	2.93	2.633	5.85	4.200	4.88	5.77	1.95
1.100	2.93	2.667	5.85	4.233	4.88	5.80	1.95
1.133	2.93	2.700	5.85	4.267	4.39	5.83	1.95
1.167	2.93	2.733	5.85	4.300	3.90	5.87	1.95
1.200	2.93	2.767	17.55	4.333	3.90	5.90	1.95
1.233	2.93	2.800	29.26	4.367	3.90	5.93	1.95
1.267	2.93	2.833	29.26	4.400	3.90	5.97	1.95
1.300	2.93	2.867	29.26	4.433	3.90	6.00	1.95
1.333	2.93	2.900	29.26	4.467	3.90	6.03	1.95
1.367	2.93	2.933	29.26	4.500	3.90	6.07	1.95
1.400	2.93	2.967	29.26	4.533	3.90	6.10	1.95
1.433	2.93	3.000	29.26	4.567	3.90	6.13	1.95
1.467	2.93	3.033	76.06	4.600	3.90	6.17	1.95
1.500	2.93	3.067	76.07	4.633	3.90	6.20	1.95
1.533	2.93	3.100	76.07	4.667	3.90	6.23	1.95
1.567	2.93	3.133	76.07	4.700	3.90	6.27	0.98

Max.Eff.Inten.(mm/hr)=	76.07	15.91	
over (min)	5.00	8.00	

Storage Coeff. (min)=	1.83 (ii)	7.22 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.42	0.15	
			TOTALS
PEAK FLOW (cms)=	0.05	0.00	0.055 (iii)
TIME TO PEAK (hrs)=	3.23	3.30	3.23
RUNOFF VOLUME (mm)=	46.76	8.41	36.01
TOTAL RAINFALL (mm)=	48.76	48.76	48.76
RUNOFF COEFFICIENT =	0.96	0.17	0.74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):		0.31	0.039	3.23	29.10
+ ID2= 2 (0160):		0.34	0.055	3.23	36.01
ID = 3 (0162):		0.65	0.094	3.23	32.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):		0.82	0.083	3.23	26.98
+ ID2= 2 (0162):		0.65	0.094	3.23	32.72
ID = 3 (0167):		1.47	0.177	3.23	29.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0140)	Area (ha)=	0.11			
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)=	76.00	
		IMPERVIOUS	PERVIOUS (i)		

SCS 6 hr_Exsting Conditions

Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	2.93	3.167	76.07	4.73	3.90
0.067	0.00	1.633	2.93	3.200	76.07	4.77	3.41
0.100	0.00	1.667	2.93	3.233	76.07	4.80	2.93
0.133	0.00	1.700	2.93	3.267	43.40	4.83	2.93
0.167	0.00	1.733	2.93	3.300	10.73	4.87	2.93
0.200	0.00	1.767	3.90	3.333	10.73	4.90	2.93
0.233	0.00	1.800	4.88	3.367	10.73	4.93	2.93
0.267	0.98	1.833	4.88	3.400	10.73	4.97	2.93
0.300	1.95	1.867	4.88	3.433	10.73	5.00	2.93
0.333	1.95	1.900	4.88	3.467	10.73	5.03	2.93
0.367	1.95	1.933	4.88	3.500	10.73	5.07	2.93
0.400	1.95	1.967	4.88	3.533	10.73	5.10	2.93
0.433	1.95	2.000	4.88	3.567	10.73	5.13	2.93
0.467	1.95	2.033	4.88	3.600	10.73	5.17	2.93
0.500	1.95	2.067	4.88	3.633	10.73	5.20	2.93
0.533	1.95	2.100	4.88	3.667	10.73	5.23	2.93
0.567	1.95	2.133	4.88	3.700	10.73	5.27	2.44
0.600	1.95	2.167	4.88	3.733	10.73	5.30	1.95
0.633	1.95	2.200	4.88	3.767	7.80	5.33	1.95
0.667	1.95	2.233	4.88	3.800	4.88	5.37	1.95
0.700	1.95	2.267	5.36	3.833	4.88	5.40	1.95
0.733	1.95	2.300	5.85	3.867	4.88	5.43	1.95
0.767	2.44	2.333	5.85	3.900	4.88	5.47	1.95
0.800	2.93	2.367	5.85	3.933	4.88	5.50	1.95
0.833	2.93	2.400	5.85	3.967	4.88	5.53	1.95
0.867	2.93	2.433	5.85	4.000	4.88	5.57	1.95
0.900	2.93	2.467	5.85	4.033	4.88	5.60	1.95
0.933	2.93	2.500	5.85	4.067	4.88	5.63	1.95
0.967	2.93	2.533	5.85	4.100	4.88	5.67	1.95
1.000	2.93	2.567	5.85	4.133	4.88	5.70	1.95
1.033	2.93	2.600	5.85	4.167	4.88	5.73	1.95
1.067	2.93	2.633	5.85	4.200	4.88	5.77	1.95
1.100	2.93	2.667	5.85	4.233	4.88	5.80	1.95
1.133	2.93	2.700	5.85	4.267	4.39	5.83	1.95
1.167	2.93	2.733	5.85	4.300	3.90	5.87	1.95
1.200	2.93	2.767	17.55	4.333	3.90	5.90	1.95
1.233	2.93	2.800	29.26	4.367	3.90	5.93	1.95

SCS 6 hr_Exsting Conditions

1.267	2.93	2.833	29.26	4.400	3.90	5.97	1.95
1.300	2.93	2.867	29.26	4.433	3.90	6.00	1.95
1.333	2.93	2.900	29.26	4.467	3.90	6.03	1.95
1.367	2.93	2.933	29.26	4.500	3.90	6.07	1.95
1.400	2.93	2.967	29.26	4.533	3.90	6.10	1.95
1.433	2.93	3.000	29.26	4.567	3.90	6.13	1.95
1.467	2.93	3.033	76.06	4.600	3.90	6.17	1.95
1.500	2.93	3.067	76.07	4.633	3.90	6.20	1.95
1.533	2.93	3.100	76.07	4.667	3.90	6.23	1.95
1.567	2.93	3.133	76.07	4.700	3.90	6.27	0.98

Max.Eff.Inten.	(mm/hr)=	76.07	15.91	
	over (min)	5.00	8.00	
Storage Coeff.	(min)=	1.30 (ii)	6.27 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	8.00	
Unit Hyd. peak	(cms)=	0.48	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.019 (iii)
TIME TO PEAK	(hrs)=	3.23	3.30	3.23
RUNOFF VOLUME	(mm)=	46.76	8.41	37.53
TOTAL RAINFALL	(mm)=	48.76	48.76	48.76
RUNOFF COEFFICIENT	=	0.96	0.17	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

SCS 12 Hr Storm Distribution_Existing Condition


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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\6f
22982d-e1d0-43b8-a99f-ccf03c0dbffc\sc
  Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\6f
22982d-e1d0-43b8-a99f-ccf03c0dbffc\sc


DATE: 01-16-2026                          TIME: 04:29:25

USER:


COMMENTS: ____________________________________________________________


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  ************************************************
  ** SIMULATION : 12hr SCS 100yr                **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\Yuan.Yuan\AppD
```



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|                  |              ata\Local\Temp\
|                  |              91c84e44-e32d-4dda-9fa8-0b4aecedc8e1\f7384fb5
| Ptotal= 89.77 mm |    Comments: 12hr SCS 100yr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	3.59	6.50	16.16	9.75	3.14
0.25	2.24	3.50	3.59	6.75	7.18	10.00	3.14
0.50	2.24	3.75	3.59	7.00	7.18	10.25	1.80
0.75	2.24	4.00	3.59	7.25	5.39	10.50	1.80
1.00	2.24	4.25	5.39	7.50	5.39	10.75	1.80
1.25	2.24	4.50	5.39	7.75	5.39	11.00	1.80
1.50	2.24	4.75	7.18	8.00	5.39	11.25	1.80
1.75	2.24	5.00	7.18	8.25	3.14	11.50	1.80
2.00	2.24	5.25	10.77	8.50	3.14	11.75	1.80
2.25	2.69	5.50	10.77	8.75	3.14	12.00	1.80
2.50	2.69	5.75	43.09	9.00	3.14		
2.75	2.69	6.00	118.50	9.25	3.14		
3.00	2.69	6.25	16.16	9.50	3.14		

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| CALIB            |
| STANDHYD (  0120)|   Area    (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  77.00   Dir. Conn.(%)=  77.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      27.08        40.00
     Mannings n             =     0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.69	6.167	118.50	9.23	3.14
0.067	0.00	3.133	2.69	6.200	118.50	9.27	3.14
0.100	0.00	3.167	2.69	6.233	118.50	9.30	3.14
0.133	0.00	3.200	2.69	6.267	67.34	9.33	3.14
0.167	0.00	3.233	2.69	6.300	16.16	9.37	3.14
0.200	0.00	3.267	3.14	6.333	16.16	9.40	3.14
0.233	0.00	3.300	3.59	6.367	16.16	9.43	3.14
0.267	1.12	3.333	3.59	6.400	16.16	9.47	3.14
0.300	2.24	3.367	3.59	6.433	16.16	9.50	3.14

0.333	2.24	3.400	3.59	6.467	16.16	9.53	3.14
0.367	2.24	3.433	3.59	6.500	16.16	9.57	3.14
0.400	2.24	3.467	3.59	6.533	16.16	9.60	3.14
0.433	2.24	3.500	3.59	6.567	16.16	9.63	3.14
0.467	2.24	3.533	3.59	6.600	16.16	9.67	3.14
0.500	2.24	3.567	3.59	6.633	16.16	9.70	3.14
0.533	2.24	3.600	3.59	6.667	16.16	9.73	3.14
0.567	2.24	3.633	3.59	6.700	16.16	9.77	3.14
0.600	2.24	3.667	3.59	6.733	16.16	9.80	3.14
0.633	2.24	3.700	3.59	6.767	11.67	9.83	3.14
0.667	2.24	3.733	3.59	6.800	7.18	9.87	3.14
0.700	2.24	3.767	3.59	6.833	7.18	9.90	3.14
0.733	2.24	3.800	3.59	6.867	7.18	9.93	3.14
0.767	2.24	3.833	3.59	6.900	7.18	9.97	3.14
0.800	2.24	3.867	3.59	6.933	7.18	10.00	3.14
0.833	2.24	3.900	3.59	6.967	7.18	10.03	3.14
0.867	2.24	3.933	3.59	7.000	7.18	10.07	3.14
0.900	2.24	3.967	3.59	7.033	7.18	10.10	3.14
0.933	2.24	4.000	3.59	7.067	7.18	10.13	3.14
0.967	2.24	4.033	3.59	7.100	7.18	10.17	3.14
1.000	2.24	4.067	3.59	7.133	7.18	10.20	3.14
1.033	2.24	4.100	3.59	7.167	7.18	10.23	3.14
1.067	2.24	4.133	3.59	7.200	7.18	10.27	2.47
1.100	2.24	4.167	3.59	7.233	7.18	10.30	1.80
1.133	2.24	4.200	3.59	7.267	6.28	10.33	1.80
1.167	2.24	4.233	3.59	7.300	5.39	10.37	1.80
1.200	2.24	4.267	4.49	7.333	5.39	10.40	1.80
1.233	2.24	4.300	5.39	7.367	5.39	10.43	1.80
1.267	2.24	4.333	5.39	7.400	5.39	10.47	1.80
1.300	2.24	4.367	5.39	7.433	5.39	10.50	1.80
1.333	2.24	4.400	5.39	7.467	5.39	10.53	1.80
1.367	2.24	4.433	5.39	7.500	5.39	10.57	1.80
1.400	2.24	4.467	5.39	7.533	5.39	10.60	1.80
1.433	2.24	4.500	5.39	7.567	5.39	10.63	1.80
1.467	2.24	4.533	5.39	7.600	5.39	10.67	1.80
1.500	2.24	4.567	5.39	7.633	5.39	10.70	1.80
1.533	2.24	4.600	5.39	7.667	5.39	10.73	1.80
1.567	2.24	4.633	5.39	7.700	5.39	10.77	1.80
1.600	2.24	4.667	5.39	7.733	5.39	10.80	1.80
1.633	2.24	4.700	5.39	7.767	5.39	10.83	1.80
1.667	2.24	4.733	5.39	7.800	5.39	10.87	1.80
1.700	2.24	4.767	6.28	7.833	5.39	10.90	1.80
1.733	2.24	4.800	7.18	7.867	5.39	10.93	1.80
1.767	2.24	4.833	7.18	7.900	5.39	10.97	1.80
1.800	2.24	4.867	7.18	7.933	5.39	11.00	1.80
1.833	2.24	4.900	7.18	7.967	5.39	11.03	1.80
1.867	2.24	4.933	7.18	8.000	5.39	11.07	1.80
1.900	2.24	4.967	7.18	8.033	5.39	11.10	1.80
1.933	2.24	5.000	7.18	8.067	5.39	11.13	1.80

1.967	2.24	5.033	7.18	8.100	5.39	11.17	1.80
2.000	2.24	5.067	7.18	8.133	5.39	11.20	1.80
2.033	2.24	5.100	7.18	8.167	5.39	11.23	1.80
2.067	2.24	5.133	7.18	8.200	5.39	11.27	1.80
2.100	2.24	5.167	7.18	8.233	5.39	11.30	1.80
2.133	2.24	5.200	7.18	8.267	4.26	11.33	1.80
2.167	2.24	5.233	7.18	8.300	3.14	11.37	1.80
2.200	2.24	5.267	8.98	8.333	3.14	11.40	1.80
2.233	2.24	5.300	10.77	8.367	3.14	11.43	1.80
2.267	2.47	5.333	10.77	8.400	3.14	11.47	1.80
2.300	2.69	5.367	10.77	8.433	3.14	11.50	1.80
2.333	2.69	5.400	10.77	8.467	3.14	11.53	1.80
2.367	2.69	5.433	10.77	8.500	3.14	11.57	1.80
2.400	2.69	5.467	10.77	8.533	3.14	11.60	1.80
2.433	2.69	5.500	10.77	8.567	3.14	11.63	1.80
2.467	2.69	5.533	10.77	8.600	3.14	11.67	1.80
2.500	2.69	5.567	10.77	8.633	3.14	11.70	1.80
2.533	2.69	5.600	10.77	8.667	3.14	11.73	1.80
2.567	2.69	5.633	10.77	8.700	3.14	11.77	1.80
2.600	2.69	5.667	10.77	8.733	3.14	11.80	1.80
2.633	2.69	5.700	10.77	8.767	3.14	11.83	1.80
2.667	2.69	5.733	10.77	8.800	3.14	11.87	1.80
2.700	2.69	5.767	26.93	8.833	3.14	11.90	1.80
2.733	2.69	5.800	43.09	8.867	3.14	11.93	1.80
2.767	2.69	5.833	43.09	8.900	3.14	11.97	1.80
2.800	2.69	5.867	43.09	8.933	3.14	12.00	1.80
2.833	2.69	5.900	43.09	8.967	3.14	12.03	1.80
2.867	2.69	5.933	43.09	9.000	3.14	12.07	1.80
2.900	2.69	5.967	43.09	9.033	3.14	12.10	1.80
2.933	2.69	6.000	43.09	9.067	3.14	12.13	1.80
2.967	2.69	6.033	118.49	9.100	3.14	12.17	1.80
3.000	2.69	6.067	118.50	9.133	3.14	12.20	1.80
3.033	2.69	6.100	118.50	9.167	3.14	12.23	1.80
3.067	2.69	6.133	118.50	9.200	3.14	12.27	0.90

```
     Max.Eff.Inten.(mm/hr)=     118.50        61.36
               over (min)          5.00         6.00
     Storage Coeff.  (min)=        1.09 (ii)    5.16 (ii)
     Unit Hyd. Tpeak (min)=        4.00         6.00
     Unit Hyd. peak  (cms)=        0.50         0.21
                                                      *TOTALS*
     PEAK FLOW       (cms)=        0.03         0.00          0.032 (iii)
     TIME TO PEAK    (hrs)=        6.23         6.27          6.23
     RUNOFF VOLUME    (mm)=       87.77        38.12         76.33
     TOTAL RAINFALL   (mm)=       89.77        89.77         89.77
     RUNOFF COEFFICIENT   =        0.98         0.42          0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
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(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0110)	Area (ha)=	0.71	
ID= 1 DT= 2.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.69	6.167	118.50	9.23	3.14
0.067	0.00	3.133	2.69	6.200	118.50	9.27	3.14
0.100	0.00	3.167	2.69	6.233	118.50	9.30	3.14
0.133	0.00	3.200	2.69	6.267	67.34	9.33	3.14
0.167	0.00	3.233	2.69	6.300	16.16	9.37	3.14
0.200	0.00	3.267	3.14	6.333	16.16	9.40	3.14
0.233	0.00	3.300	3.59	6.367	16.16	9.43	3.14
0.267	1.12	3.333	3.59	6.400	16.16	9.47	3.14
0.300	2.24	3.367	3.59	6.433	16.16	9.50	3.14
0.333	2.24	3.400	3.59	6.467	16.16	9.53	3.14
0.367	2.24	3.433	3.59	6.500	16.16	9.57	3.14
0.400	2.24	3.467	3.59	6.533	16.16	9.60	3.14
0.433	2.24	3.500	3.59	6.567	16.16	9.63	3.14
0.467	2.24	3.533	3.59	6.600	16.16	9.67	3.14
0.500	2.24	3.567	3.59	6.633	16.16	9.70	3.14
0.533	2.24	3.600	3.59	6.667	16.16	9.73	3.14
0.567	2.24	3.633	3.59	6.700	16.16	9.77	3.14
0.600	2.24	3.667	3.59	6.733	16.16	9.80	3.14
0.633	2.24	3.700	3.59	6.767	11.67	9.83	3.14
0.667	2.24	3.733	3.59	6.800	7.18	9.87	3.14
0.700	2.24	3.767	3.59	6.833	7.18	9.90	3.14
0.733	2.24	3.800	3.59	6.867	7.18	9.93	3.14
0.767	2.24	3.833	3.59	6.900	7.18	9.97	3.14
0.800	2.24	3.867	3.59	6.933	7.18	10.00	3.14
0.833	2.24	3.900	3.59	6.967	7.18	10.03	3.14
0.867	2.24	3.933	3.59	7.000	7.18	10.07	3.14
0.900	2.24	3.967	3.59	7.033	7.18	10.10	3.14
0.933	2.24	4.000	3.59	7.067	7.18	10.13	3.14
0.967	2.24	4.033	3.59	7.100	7.18	10.17	3.14
1.000	2.24	4.067	3.59	7.133	7.18	10.20	3.14
1.033	2.24	4.100	3.59	7.167	7.18	10.23	3.14
1.067	2.24	4.133	3.59	7.200	7.18	10.27	2.47
1.100	2.24	4.167	3.59	7.233	7.18	10.30	1.80
1.133	2.24	4.200	3.59	7.267	6.28	10.33	1.80
1.167	2.24	4.233	3.59	7.300	5.39	10.37	1.80
1.200	2.24	4.267	4.49	7.333	5.39	10.40	1.80
1.233	2.24	4.300	5.39	7.367	5.39	10.43	1.80
1.267	2.24	4.333	5.39	7.400	5.39	10.47	1.80
1.300	2.24	4.367	5.39	7.433	5.39	10.50	1.80
1.333	2.24	4.400	5.39	7.467	5.39	10.53	1.80
1.367	2.24	4.433	5.39	7.500	5.39	10.57	1.80
1.400	2.24	4.467	5.39	7.533	5.39	10.60	1.80
1.433	2.24	4.500	5.39	7.567	5.39	10.63	1.80
1.467	2.24	4.533	5.39	7.600	5.39	10.67	1.80
1.500	2.24	4.567	5.39	7.633	5.39	10.70	1.80
1.533	2.24	4.600	5.39	7.667	5.39	10.73	1.80
1.567	2.24	4.633	5.39	7.700	5.39	10.77	1.80
1.600	2.24	4.667	5.39	7.733	5.39	10.80	1.80
1.633	2.24	4.700	5.39	7.767	5.39	10.83	1.80
1.667	2.24	4.733	5.39	7.800	5.39	10.87	1.80
1.700	2.24	4.767	6.28	7.833	5.39	10.90	1.80
1.733	2.24	4.800	7.18	7.867	5.39	10.93	1.80
1.767	2.24	4.833	7.18	7.900	5.39	10.97	1.80
1.800	2.24	4.867	7.18	7.933	5.39	11.00	1.80
1.833	2.24	4.900	7.18	7.967	5.39	11.03	1.80
1.867	2.24	4.933	7.18	8.000	5.39	11.07	1.80
1.900	2.24	4.967	7.18	8.033	5.39	11.10	1.80
1.933	2.24	5.000	7.18	8.067	5.39	11.13	1.80
1.967	2.24	5.033	7.18	8.100	5.39	11.17	1.80
2.000	2.24	5.067	7.18	8.133	5.39	11.20	1.80
2.033	2.24	5.100	7.18	8.167	5.39	11.23	1.80
2.067	2.24	5.133	7.18	8.200	5.39	11.27	1.80
2.100	2.24	5.167	7.18	8.233	5.39	11.30	1.80
2.133	2.24	5.200	7.18	8.267	4.26	11.33	1.80
2.167	2.24	5.233	7.18	8.300	3.14	11.37	1.80
2.200	2.24	5.267	8.98	8.333	3.14	11.40	1.80
2.233	2.24	5.300	10.77	8.367	3.14	11.43	1.80
2.267	2.47	5.333	10.77	8.400	3.14	11.47	1.80
2.300	2.69	5.367	10.77	8.433	3.14	11.50	1.80
2.333	2.69	5.400	10.77	8.467	3.14	11.53	1.80
2.367	2.69	5.433	10.77	8.500	3.14	11.57	1.80
2.400	2.69	5.467	10.77	8.533	3.14	11.60	1.80
2.433	2.69	5.500	10.77	8.567	3.14	11.63	1.80
2.467	2.69	5.533	10.77	8.600	3.14	11.67	1.80
2.500	2.69	5.567	10.77	8.633	3.14	11.70	1.80
2.533	2.69	5.600	10.77	8.667	3.14	11.73	1.80
2.567	2.69	5.633	10.77	8.700	3.14	11.77	1.80
2.600	2.69	5.667	10.77	8.733	3.14	11.80	1.80
2.633	2.69	5.700	10.77	8.767	3.14	11.83	1.80
2.667	2.69	5.733	10.77	8.800	3.14	11.87	1.80
2.700	2.69	5.767	26.93	8.833	3.14	11.90	1.80
2.733	2.69	5.800	43.09	8.867	3.14	11.93	1.80
2.767	2.69	5.833	43.09	8.900	3.14	11.97	1.80
2.800	2.69	5.867	43.09	8.933	3.14	12.00	1.80
2.833	2.69	5.900	43.09	8.967	3.14	12.03	1.80
2.867	2.69	5.933	43.09	9.000	3.14	12.07	1.80
2.900	2.69	5.967	43.09	9.033	3.14	12.10	1.80
2.933	2.69	6.000	43.09	9.067	3.14	12.13	1.80
2.967	2.69	6.033	118.49	9.100	3.14	12.17	1.80
3.000	2.69	6.067	118.50	9.133	3.14	12.20	1.80
3.033	2.69	6.100	118.50	9.167	3.14	12.23	1.80
3.067	2.69	6.133	118.50	9.200	3.14	12.27	0.90

Max.Eff.Inten.(mm/hr)=		118.50	61.36	
	over (min)	5.00	12.00	
Storage Coeff. (min)=		1.91 (ii)	10.49 (ii)	
Unit Hyd. Tpeak (min)=		4.00	12.00	
Unit Hyd. peak (cms)=		0.42	0.10	
				TOTALS
PEAK FLOW	(cms)=	0.08	0.05	0.128 (iii)
TIME TO PEAK	(hrs)=	6.23	6.33	6.23
RUNOFF VOLUME	(mm)=	87.77	38.12	55.98
TOTAL RAINFALL	(mm)=	89.77	89.77	89.77
RUNOFF COEFFICIENT	=	0.98	0.42	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0110):	0.71	0.128	6.23	55.98
+ ID2= 2 (0120):	0.11	0.032	6.23	76.33

ID = 3 (0122): 0.82 0.159 6.23 58.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)=	0.31	
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.69	6.167	118.50	9.23	3.14
0.067	0.00	3.133	2.69	6.200	118.50	9.27	3.14
0.100	0.00	3.167	2.69	6.233	118.50	9.30	3.14
0.133	0.00	3.200	2.69	6.267	67.34	9.33	3.14
0.167	0.00	3.233	2.69	6.300	16.16	9.37	3.14
0.200	0.00	3.267	3.14	6.333	16.16	9.40	3.14
0.233	0.00	3.300	3.59	6.367	16.16	9.43	3.14
0.267	1.12	3.333	3.59	6.400	16.16	9.47	3.14
0.300	2.24	3.367	3.59	6.433	16.16	9.50	3.14
0.333	2.24	3.400	3.59	6.467	16.16	9.53	3.14
0.367	2.24	3.433	3.59	6.500	16.16	9.57	3.14
0.400	2.24	3.467	3.59	6.533	16.16	9.60	3.14
0.433	2.24	3.500	3.59	6.567	16.16	9.63	3.14
0.467	2.24	3.533	3.59	6.600	16.16	9.67	3.14
0.500	2.24	3.567	3.59	6.633	16.16	9.70	3.14
0.533	2.24	3.600	3.59	6.667	16.16	9.73	3.14
0.567	2.24	3.633	3.59	6.700	16.16	9.77	3.14
0.600	2.24	3.667	3.59	6.733	16.16	9.80	3.14
0.633	2.24	3.700	3.59	6.767	11.67	9.83	3.14
0.667	2.24	3.733	3.59	6.800	7.18	9.87	3.14
0.700	2.24	3.767	3.59	6.833	7.18	9.90	3.14
0.733	2.24	3.800	3.59	6.867	7.18	9.93	3.14
0.767	2.24	3.833	3.59	6.900	7.18	9.97	3.14
0.800	2.24	3.867	3.59	6.933	7.18	10.00	3.14
0.833	2.24	3.900	3.59	6.967	7.18	10.03	3.14
0.867	2.24	3.933	3.59	7.000	7.18	10.07	3.14
0.900	2.24	3.967	3.59	7.033	7.18	10.10	3.14

0.933	2.24	4.000	3.59	7.067	7.18	10.13	3.14
0.967	2.24	4.033	3.59	7.100	7.18	10.17	3.14
1.000	2.24	4.067	3.59	7.133	7.18	10.20	3.14
1.033	2.24	4.100	3.59	7.167	7.18	10.23	3.14
1.067	2.24	4.133	3.59	7.200	7.18	10.27	2.47
1.100	2.24	4.167	3.59	7.233	7.18	10.30	1.80
1.133	2.24	4.200	3.59	7.267	6.28	10.33	1.80
1.167	2.24	4.233	3.59	7.300	5.39	10.37	1.80
1.200	2.24	4.267	4.49	7.333	5.39	10.40	1.80
1.233	2.24	4.300	5.39	7.367	5.39	10.43	1.80
1.267	2.24	4.333	5.39	7.400	5.39	10.47	1.80
1.300	2.24	4.367	5.39	7.433	5.39	10.50	1.80
1.333	2.24	4.400	5.39	7.467	5.39	10.53	1.80
1.367	2.24	4.433	5.39	7.500	5.39	10.57	1.80
1.400	2.24	4.467	5.39	7.533	5.39	10.60	1.80
1.433	2.24	4.500	5.39	7.567	5.39	10.63	1.80
1.467	2.24	4.533	5.39	7.600	5.39	10.67	1.80
1.500	2.24	4.567	5.39	7.633	5.39	10.70	1.80
1.533	2.24	4.600	5.39	7.667	5.39	10.73	1.80
1.567	2.24	4.633	5.39	7.700	5.39	10.77	1.80
1.600	2.24	4.667	5.39	7.733	5.39	10.80	1.80
1.633	2.24	4.700	5.39	7.767	5.39	10.83	1.80
1.667	2.24	4.733	5.39	7.800	5.39	10.87	1.80
1.700	2.24	4.767	6.28	7.833	5.39	10.90	1.80
1.733	2.24	4.800	7.18	7.867	5.39	10.93	1.80
1.767	2.24	4.833	7.18	7.900	5.39	10.97	1.80
1.800	2.24	4.867	7.18	7.933	5.39	11.00	1.80
1.833	2.24	4.900	7.18	7.967	5.39	11.03	1.80
1.867	2.24	4.933	7.18	8.000	5.39	11.07	1.80
1.900	2.24	4.967	7.18	8.033	5.39	11.10	1.80
1.933	2.24	5.000	7.18	8.067	5.39	11.13	1.80
1.967	2.24	5.033	7.18	8.100	5.39	11.17	1.80
2.000	2.24	5.067	7.18	8.133	5.39	11.20	1.80
2.033	2.24	5.100	7.18	8.167	5.39	11.23	1.80
2.067	2.24	5.133	7.18	8.200	5.39	11.27	1.80
2.100	2.24	5.167	7.18	8.233	5.39	11.30	1.80
2.133	2.24	5.200	7.18	8.267	4.26	11.33	1.80
2.167	2.24	5.233	7.18	8.300	3.14	11.37	1.80
2.200	2.24	5.267	8.98	8.333	3.14	11.40	1.80
2.233	2.24	5.300	10.77	8.367	3.14	11.43	1.80
2.267	2.47	5.333	10.77	8.400	3.14	11.47	1.80
2.300	2.69	5.367	10.77	8.433	3.14	11.50	1.80
2.333	2.69	5.400	10.77	8.467	3.14	11.53	1.80
2.367	2.69	5.433	10.77	8.500	3.14	11.57	1.80
2.400	2.69	5.467	10.77	8.533	3.14	11.60	1.80
2.433	2.69	5.500	10.77	8.567	3.14	11.63	1.80
2.467	2.69	5.533	10.77	8.600	3.14	11.67	1.80
2.500	2.69	5.567	10.77	8.633	3.14	11.70	1.80
2.533	2.69	5.600	10.77	8.667	3.14	11.73	1.80

2.567	2.69	5.633	10.77	8.700	3.14	11.77	1.80
2.600	2.69	5.667	10.77	8.733	3.14	11.80	1.80
2.633	2.69	5.700	10.77	8.767	3.14	11.83	1.80
2.667	2.69	5.733	10.77	8.800	3.14	11.87	1.80
2.700	2.69	5.767	26.93	8.833	3.14	11.90	1.80
2.733	2.69	5.800	43.09	8.867	3.14	11.93	1.80
2.767	2.69	5.833	43.09	8.900	3.14	11.97	1.80
2.800	2.69	5.867	43.09	8.933	3.14	12.00	1.80
2.833	2.69	5.900	43.09	8.967	3.14	12.03	1.80
2.867	2.69	5.933	43.09	9.000	3.14	12.07	1.80
2.900	2.69	5.967	43.09	9.033	3.14	12.10	1.80
2.933	2.69	6.000	43.09	9.067	3.14	12.13	1.80
2.967	2.69	6.033	118.49	9.100	3.14	12.17	1.80
3.000	2.69	6.067	118.50	9.133	3.14	12.20	1.80
3.033	2.69	6.100	118.50	9.167	3.14	12.23	1.80
3.067	2.69	6.133	118.50	9.200	3.14	12.27	0.90

Max.Eff.Inten.(mm/hr)=		118.50	42.52
over (min)		5.00	8.00
Storage Coeff. (min)=		1.49 (ii)	7.67 (ii)
Unit Hyd. Tpeak (min)=		4.00	8.00
Unit Hyd. peak (cms)=		0.46	0.15
			TOTALS
PEAK FLOW	(cms)=	0.06	0.01	0.067 (iii)
TIME TO PEAK	(hrs)=	6.23	6.30	6.23
RUNOFF VOLUME	(mm)=	87.77	26.74	59.68
TOTAL RAINFALL	(mm)=	89.77	89.77	89.77
RUNOFF COEFFICIENT	=	0.98	0.30	0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	0.00	3.100	2.69	6.167	118.50	9.23	3.14
0.067	0.00	3.133	2.69	6.200	118.50	9.27	3.14
0.100	0.00	3.167	2.69	6.233	118.50	9.30	3.14
0.133	0.00	3.200	2.69	6.267	67.34	9.33	3.14
0.167	0.00	3.233	2.69	6.300	16.16	9.37	3.14
0.200	0.00	3.267	3.14	6.333	16.16	9.40	3.14
0.233	0.00	3.300	3.59	6.367	16.16	9.43	3.14
0.267	1.12	3.333	3.59	6.400	16.16	9.47	3.14
0.300	2.24	3.367	3.59	6.433	16.16	9.50	3.14
0.333	2.24	3.400	3.59	6.467	16.16	9.53	3.14
0.367	2.24	3.433	3.59	6.500	16.16	9.57	3.14
0.400	2.24	3.467	3.59	6.533	16.16	9.60	3.14
0.433	2.24	3.500	3.59	6.567	16.16	9.63	3.14
0.467	2.24	3.533	3.59	6.600	16.16	9.67	3.14
0.500	2.24	3.567	3.59	6.633	16.16	9.70	3.14
0.533	2.24	3.600	3.59	6.667	16.16	9.73	3.14
0.567	2.24	3.633	3.59	6.700	16.16	9.77	3.14
0.600	2.24	3.667	3.59	6.733	16.16	9.80	3.14
0.633	2.24	3.700	3.59	6.767	11.67	9.83	3.14
0.667	2.24	3.733	3.59	6.800	7.18	9.87	3.14
0.700	2.24	3.767	3.59	6.833	7.18	9.90	3.14
0.733	2.24	3.800	3.59	6.867	7.18	9.93	3.14
0.767	2.24	3.833	3.59	6.900	7.18	9.97	3.14
0.800	2.24	3.867	3.59	6.933	7.18	10.00	3.14
0.833	2.24	3.900	3.59	6.967	7.18	10.03	3.14
0.867	2.24	3.933	3.59	7.000	7.18	10.07	3.14
0.900	2.24	3.967	3.59	7.033	7.18	10.10	3.14
0.933	2.24	4.000	3.59	7.067	7.18	10.13	3.14
0.967	2.24	4.033	3.59	7.100	7.18	10.17	3.14
1.000	2.24	4.067	3.59	7.133	7.18	10.20	3.14
1.033	2.24	4.100	3.59	7.167	7.18	10.23	3.14
1.067	2.24	4.133	3.59	7.200	7.18	10.27	2.47
1.100	2.24	4.167	3.59	7.233	7.18	10.30	1.80
1.133	2.24	4.200	3.59	7.267	6.28	10.33	1.80
1.167	2.24	4.233	3.59	7.300	5.39	10.37	1.80
1.200	2.24	4.267	4.49	7.333	5.39	10.40	1.80
1.233	2.24	4.300	5.39	7.367	5.39	10.43	1.80
1.267	2.24	4.333	5.39	7.400	5.39	10.47	1.80
1.300	2.24	4.367	5.39	7.433	5.39	10.50	1.80
1.333	2.24	4.400	5.39	7.467	5.39	10.53	1.80
1.367	2.24	4.433	5.39	7.500	5.39	10.57	1.80
1.400	2.24	4.467	5.39	7.533	5.39	10.60	1.80

1.433	2.24	4.500	5.39	7.567	5.39	10.63	1.80
1.467	2.24	4.533	5.39	7.600	5.39	10.67	1.80
1.500	2.24	4.567	5.39	7.633	5.39	10.70	1.80
1.533	2.24	4.600	5.39	7.667	5.39	10.73	1.80
1.567	2.24	4.633	5.39	7.700	5.39	10.77	1.80
1.600	2.24	4.667	5.39	7.733	5.39	10.80	1.80
1.633	2.24	4.700	5.39	7.767	5.39	10.83	1.80
1.667	2.24	4.733	5.39	7.800	5.39	10.87	1.80
1.700	2.24	4.767	6.28	7.833	5.39	10.90	1.80
1.733	2.24	4.800	7.18	7.867	5.39	10.93	1.80
1.767	2.24	4.833	7.18	7.900	5.39	10.97	1.80
1.800	2.24	4.867	7.18	7.933	5.39	11.00	1.80
1.833	2.24	4.900	7.18	7.967	5.39	11.03	1.80
1.867	2.24	4.933	7.18	8.000	5.39	11.07	1.80
1.900	2.24	4.967	7.18	8.033	5.39	11.10	1.80
1.933	2.24	5.000	7.18	8.067	5.39	11.13	1.80
1.967	2.24	5.033	7.18	8.100	5.39	11.17	1.80
2.000	2.24	5.067	7.18	8.133	5.39	11.20	1.80
2.033	2.24	5.100	7.18	8.167	5.39	11.23	1.80
2.067	2.24	5.133	7.18	8.200	5.39	11.27	1.80
2.100	2.24	5.167	7.18	8.233	5.39	11.30	1.80
2.133	2.24	5.200	7.18	8.267	4.26	11.33	1.80
2.167	2.24	5.233	7.18	8.300	3.14	11.37	1.80
2.200	2.24	5.267	8.98	8.333	3.14	11.40	1.80
2.233	2.24	5.300	10.77	8.367	3.14	11.43	1.80
2.267	2.47	5.333	10.77	8.400	3.14	11.47	1.80
2.300	2.69	5.367	10.77	8.433	3.14	11.50	1.80
2.333	2.69	5.400	10.77	8.467	3.14	11.53	1.80
2.367	2.69	5.433	10.77	8.500	3.14	11.57	1.80
2.400	2.69	5.467	10.77	8.533	3.14	11.60	1.80
2.433	2.69	5.500	10.77	8.567	3.14	11.63	1.80
2.467	2.69	5.533	10.77	8.600	3.14	11.67	1.80
2.500	2.69	5.567	10.77	8.633	3.14	11.70	1.80
2.533	2.69	5.600	10.77	8.667	3.14	11.73	1.80
2.567	2.69	5.633	10.77	8.700	3.14	11.77	1.80
2.600	2.69	5.667	10.77	8.733	3.14	11.80	1.80
2.633	2.69	5.700	10.77	8.767	3.14	11.83	1.80
2.667	2.69	5.733	10.77	8.800	3.14	11.87	1.80
2.700	2.69	5.767	26.93	8.833	3.14	11.90	1.80
2.733	2.69	5.800	43.09	8.867	3.14	11.93	1.80
2.767	2.69	5.833	43.09	8.900	3.14	11.97	1.80
2.800	2.69	5.867	43.09	8.933	3.14	12.00	1.80
2.833	2.69	5.900	43.09	8.967	3.14	12.03	1.80
2.867	2.69	5.933	43.09	9.000	3.14	12.07	1.80
2.900	2.69	5.967	43.09	9.033	3.14	12.10	1.80
2.933	2.69	6.000	43.09	9.067	3.14	12.13	1.80
2.967	2.69	6.033	118.49	9.100	3.14	12.17	1.80
3.000	2.69	6.067	118.50	9.133	3.14	12.20	1.80
3.033	2.69	6.100	118.50	9.167	3.14	12.23	1.80

3.067	2.69	6.133	118.50	9.200	3.14	12.27	0.90

Max.Eff.Inten.(mm/hr)=	118.50	42.52	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.53 (ii)	6.05 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.45	0.17	
			TOTALS
PEAK FLOW (cms)=	0.08	0.01	0.090 (iii)
TIME TO PEAK (hrs)=	6.23	6.27	6.23
RUNOFF VOLUME (mm)=	87.77	26.74	70.67
TOTAL RAINFALL (mm)=	89.77	89.77	89.77
RUNOFF COEFFICIENT =	0.98	0.30	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):		0.31	0.067	6.23	59.68
+ ID2= 2 (0160):		0.34	0.090	6.23	70.67
ID = 3 (0162):		0.65	0.157	6.23	65.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):		0.82	0.159	6.23	58.71
+ ID2= 2 (0162):		0.65	0.157	6.23	65.43
ID = 3 (0167):		1.47	0.316	6.23	61.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

STANDHYD (0140)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.69	6.167	118.50	9.23	3.14
0.067	0.00	3.133	2.69	6.200	118.50	9.27	3.14
0.100	0.00	3.167	2.69	6.233	118.50	9.30	3.14
0.133	0.00	3.200	2.69	6.267	67.34	9.33	3.14
0.167	0.00	3.233	2.69	6.300	16.16	9.37	3.14
0.200	0.00	3.267	3.14	6.333	16.16	9.40	3.14
0.233	0.00	3.300	3.59	6.367	16.16	9.43	3.14
0.267	1.12	3.333	3.59	6.400	16.16	9.47	3.14
0.300	2.24	3.367	3.59	6.433	16.16	9.50	3.14
0.333	2.24	3.400	3.59	6.467	16.16	9.53	3.14
0.367	2.24	3.433	3.59	6.500	16.16	9.57	3.14
0.400	2.24	3.467	3.59	6.533	16.16	9.60	3.14
0.433	2.24	3.500	3.59	6.567	16.16	9.63	3.14
0.467	2.24	3.533	3.59	6.600	16.16	9.67	3.14
0.500	2.24	3.567	3.59	6.633	16.16	9.70	3.14
0.533	2.24	3.600	3.59	6.667	16.16	9.73	3.14
0.567	2.24	3.633	3.59	6.700	16.16	9.77	3.14
0.600	2.24	3.667	3.59	6.733	16.16	9.80	3.14
0.633	2.24	3.700	3.59	6.767	11.67	9.83	3.14
0.667	2.24	3.733	3.59	6.800	7.18	9.87	3.14
0.700	2.24	3.767	3.59	6.833	7.18	9.90	3.14
0.733	2.24	3.800	3.59	6.867	7.18	9.93	3.14
0.767	2.24	3.833	3.59	6.900	7.18	9.97	3.14
0.800	2.24	3.867	3.59	6.933	7.18	10.00	3.14
0.833	2.24	3.900	3.59	6.967	7.18	10.03	3.14
0.867	2.24	3.933	3.59	7.000	7.18	10.07	3.14
0.900	2.24	3.967	3.59	7.033	7.18	10.10	3.14
0.933	2.24	4.000	3.59	7.067	7.18	10.13	3.14
0.967	2.24	4.033	3.59	7.100	7.18	10.17	3.14
1.000	2.24	4.067	3.59	7.133	7.18	10.20	3.14
1.033	2.24	4.100	3.59	7.167	7.18	10.23	3.14
1.067	2.24	4.133	3.59	7.200	7.18	10.27	2.47
1.100	2.24	4.167	3.59	7.233	7.18	10.30	1.80

1.133	2.24	4.200	3.59	7.267	6.28	10.33	1.80
1.167	2.24	4.233	3.59	7.300	5.39	10.37	1.80
1.200	2.24	4.267	4.49	7.333	5.39	10.40	1.80
1.233	2.24	4.300	5.39	7.367	5.39	10.43	1.80
1.267	2.24	4.333	5.39	7.400	5.39	10.47	1.80
1.300	2.24	4.367	5.39	7.433	5.39	10.50	1.80
1.333	2.24	4.400	5.39	7.467	5.39	10.53	1.80
1.367	2.24	4.433	5.39	7.500	5.39	10.57	1.80
1.400	2.24	4.467	5.39	7.533	5.39	10.60	1.80
1.433	2.24	4.500	5.39	7.567	5.39	10.63	1.80
1.467	2.24	4.533	5.39	7.600	5.39	10.67	1.80
1.500	2.24	4.567	5.39	7.633	5.39	10.70	1.80
1.533	2.24	4.600	5.39	7.667	5.39	10.73	1.80
1.567	2.24	4.633	5.39	7.700	5.39	10.77	1.80
1.600	2.24	4.667	5.39	7.733	5.39	10.80	1.80
1.633	2.24	4.700	5.39	7.767	5.39	10.83	1.80
1.667	2.24	4.733	5.39	7.800	5.39	10.87	1.80
1.700	2.24	4.767	6.28	7.833	5.39	10.90	1.80
1.733	2.24	4.800	7.18	7.867	5.39	10.93	1.80
1.767	2.24	4.833	7.18	7.900	5.39	10.97	1.80
1.800	2.24	4.867	7.18	7.933	5.39	11.00	1.80
1.833	2.24	4.900	7.18	7.967	5.39	11.03	1.80
1.867	2.24	4.933	7.18	8.000	5.39	11.07	1.80
1.900	2.24	4.967	7.18	8.033	5.39	11.10	1.80
1.933	2.24	5.000	7.18	8.067	5.39	11.13	1.80
1.967	2.24	5.033	7.18	8.100	5.39	11.17	1.80
2.000	2.24	5.067	7.18	8.133	5.39	11.20	1.80
2.033	2.24	5.100	7.18	8.167	5.39	11.23	1.80
2.067	2.24	5.133	7.18	8.200	5.39	11.27	1.80
2.100	2.24	5.167	7.18	8.233	5.39	11.30	1.80
2.133	2.24	5.200	7.18	8.267	4.26	11.33	1.80
2.167	2.24	5.233	7.18	8.300	3.14	11.37	1.80
2.200	2.24	5.267	8.98	8.333	3.14	11.40	1.80
2.233	2.24	5.300	10.77	8.367	3.14	11.43	1.80
2.267	2.47	5.333	10.77	8.400	3.14	11.47	1.80
2.300	2.69	5.367	10.77	8.433	3.14	11.50	1.80
2.333	2.69	5.400	10.77	8.467	3.14	11.53	1.80
2.367	2.69	5.433	10.77	8.500	3.14	11.57	1.80
2.400	2.69	5.467	10.77	8.533	3.14	11.60	1.80
2.433	2.69	5.500	10.77	8.567	3.14	11.63	1.80
2.467	2.69	5.533	10.77	8.600	3.14	11.67	1.80
2.500	2.69	5.567	10.77	8.633	3.14	11.70	1.80
2.533	2.69	5.600	10.77	8.667	3.14	11.73	1.80
2.567	2.69	5.633	10.77	8.700	3.14	11.77	1.80
2.600	2.69	5.667	10.77	8.733	3.14	11.80	1.80
2.633	2.69	5.700	10.77	8.767	3.14	11.83	1.80
2.667	2.69	5.733	10.77	8.800	3.14	11.87	1.80
2.700	2.69	5.767	26.93	8.833	3.14	11.90	1.80
2.733	2.69	5.800	43.09	8.867	3.14	11.93	1.80

2.767	2.69	5.833	43.09	8.900	3.14	11.97	1.80
2.800	2.69	5.867	43.09	8.933	3.14	12.00	1.80
2.833	2.69	5.900	43.09	8.967	3.14	12.03	1.80
2.867	2.69	5.933	43.09	9.000	3.14	12.07	1.80
2.900	2.69	5.967	43.09	9.033	3.14	12.10	1.80
2.933	2.69	6.000	43.09	9.067	3.14	12.13	1.80
2.967	2.69	6.033	118.49	9.100	3.14	12.17	1.80
3.000	2.69	6.067	118.50	9.133	3.14	12.20	1.80
3.033	2.69	6.100	118.50	9.167	3.14	12.23	1.80
3.067	2.69	6.133	118.50	9.200	3.14	12.27	0.90

Max.Eff.Inten.(mm/hr)=	118.50	42.52	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.09 (ii)	5.25 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.030 (iii)
TIME TO PEAK (hrs)=	6.23	6.27	6.23
RUNOFF VOLUME (mm)=	87.77	26.74	73.10
TOTAL RAINFALL (mm)=	89.77	89.77	89.77
RUNOFF COEFFICIENT =	0.98	0.30	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

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      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
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OOO T T H H Y M M OOO
Developed and Distributed by Smart City Water Inc

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0e85de6b-9c19-4ced-8fe8-83aa5e00382e\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0e85de6b-9c19-4ced-8fe8-83aa5e00382e\sc

DATE: 01-16-2026 TIME: 04:29:25

USER:

COMMENTS: _____

** SIMULATION : 12hr SCS 10yr **

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\91c84e44-e32d-4dda-9fa8-0b4aecedc8e1\8bc25479
Ptotal= 62.32 mm	Comments: 12hr SCS 10yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	2.49	6.50	11.22	9.75	2.18
0.25	1.56	3.50	2.49	6.75	4.99	10.00	2.18
0.50	1.56	3.75	2.49	7.00	4.99	10.25	1.25
0.75	1.56	4.00	2.49	7.25	3.74	10.50	1.25
1.00	1.56	4.25	3.74	7.50	3.74	10.75	1.25
1.25	1.56	4.50	3.74	7.75	3.74	11.00	1.25
1.50	1.56	4.75	4.99	8.00	3.74	11.25	1.25
1.75	1.56	5.00	4.99	8.25	2.18	11.50	1.25
2.00	1.56	5.25	7.48	8.50	2.18	11.75	1.25
2.25	1.87	5.50	7.48	8.75	2.18	12.00	1.25
2.50	1.87	5.75	29.91	9.00	2.18		
2.75	1.87	6.00	82.26	9.25	2.18		
3.00	1.87	6.25	11.22	9.50	2.18		

CALIB	
STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.87	6.167	82.26	9.23	2.18
0.067	0.00	3.133	1.87	6.200	82.26	9.27	2.18
0.100	0.00	3.167	1.87	6.233	82.26	9.30	2.18
0.133	0.00	3.200	1.87	6.267	46.75	9.33	2.18
0.167	0.00	3.233	1.87	6.300	11.22	9.37	2.18
0.200	0.00	3.267	2.18	6.333	11.22	9.40	2.18
0.233	0.00	3.300	2.49	6.367	11.22	9.43	2.18
0.267	0.78	3.333	2.49	6.400	11.22	9.47	2.18
0.300	1.56	3.367	2.49	6.433	11.22	9.50	2.18
0.333	1.56	3.400	2.49	6.467	11.22	9.53	2.18
0.367	1.56	3.433	2.49	6.500	11.22	9.57	2.18
0.400	1.56	3.467	2.49	6.533	11.22	9.60	2.18
0.433	1.56	3.500	2.49	6.567	11.22	9.63	2.18
0.467	1.56	3.533	2.49	6.600	11.22	9.67	2.18
0.500	1.56	3.567	2.49	6.633	11.22	9.70	2.18
0.533	1.56	3.600	2.49	6.667	11.22	9.73	2.18
0.567	1.56	3.633	2.49	6.700	11.22	9.77	2.18
0.600	1.56	3.667	2.49	6.733	11.22	9.80	2.18
0.633	1.56	3.700	2.49	6.767	8.10	9.83	2.18
0.667	1.56	3.733	2.49	6.800	4.99	9.87	2.18
0.700	1.56	3.767	2.49	6.833	4.99	9.90	2.18

0.733	1.56	3.800	2.49	6.867	4.99	9.93	2.18
0.767	1.56	3.833	2.49	6.900	4.99	9.97	2.18
0.800	1.56	3.867	2.49	6.933	4.99	10.00	2.18
0.833	1.56	3.900	2.49	6.967	4.99	10.03	2.18
0.867	1.56	3.933	2.49	7.000	4.99	10.07	2.18
0.900	1.56	3.967	2.49	7.033	4.99	10.10	2.18
0.933	1.56	4.000	2.49	7.067	4.99	10.13	2.18
0.967	1.56	4.033	2.49	7.100	4.99	10.17	2.18
1.000	1.56	4.067	2.49	7.133	4.99	10.20	2.18
1.033	1.56	4.100	2.49	7.167	4.99	10.23	2.18
1.067	1.56	4.133	2.49	7.200	4.99	10.27	1.71
1.100	1.56	4.167	2.49	7.233	4.99	10.30	1.25
1.133	1.56	4.200	2.49	7.267	4.36	10.33	1.25
1.167	1.56	4.233	2.49	7.300	3.74	10.37	1.25
1.200	1.56	4.267	3.12	7.333	3.74	10.40	1.25
1.233	1.56	4.300	3.74	7.367	3.74	10.43	1.25
1.267	1.56	4.333	3.74	7.400	3.74	10.47	1.25
1.300	1.56	4.367	3.74	7.433	3.74	10.50	1.25
1.333	1.56	4.400	3.74	7.467	3.74	10.53	1.25
1.367	1.56	4.433	3.74	7.500	3.74	10.57	1.25
1.400	1.56	4.467	3.74	7.533	3.74	10.60	1.25
1.433	1.56	4.500	3.74	7.567	3.74	10.63	1.25
1.467	1.56	4.533	3.74	7.600	3.74	10.67	1.25
1.500	1.56	4.567	3.74	7.633	3.74	10.70	1.25
1.533	1.56	4.600	3.74	7.667	3.74	10.73	1.25
1.567	1.56	4.633	3.74	7.700	3.74	10.77	1.25
1.600	1.56	4.667	3.74	7.733	3.74	10.80	1.25
1.633	1.56	4.700	3.74	7.767	3.74	10.83	1.25
1.667	1.56	4.733	3.74	7.800	3.74	10.87	1.25
1.700	1.56	4.767	4.36	7.833	3.74	10.90	1.25
1.733	1.56	4.800	4.99	7.867	3.74	10.93	1.25
1.767	1.56	4.833	4.99	7.900	3.74	10.97	1.25
1.800	1.56	4.867	4.99	7.933	3.74	11.00	1.25
1.833	1.56	4.900	4.99	7.967	3.74	11.03	1.25
1.867	1.56	4.933	4.99	8.000	3.74	11.07	1.25
1.900	1.56	4.967	4.99	8.033	3.74	11.10	1.25
1.933	1.56	5.000	4.99	8.067	3.74	11.13	1.25
1.967	1.56	5.033	4.99	8.100	3.74	11.17	1.25
2.000	1.56	5.067	4.99	8.133	3.74	11.20	1.25
2.033	1.56	5.100	4.99	8.167	3.74	11.23	1.25
2.067	1.56	5.133	4.99	8.200	3.74	11.27	1.25
2.100	1.56	5.167	4.99	8.233	3.74	11.30	1.25
2.133	1.56	5.200	4.99	8.267	2.96	11.33	1.25
2.167	1.56	5.233	4.99	8.300	2.18	11.37	1.25
2.200	1.56	5.267	6.23	8.333	2.18	11.40	1.25
2.233	1.56	5.300	7.48	8.367	2.18	11.43	1.25
2.267	1.71	5.333	7.48	8.400	2.18	11.47	1.25
2.300	1.87	5.367	7.48	8.433	2.18	11.50	1.25
2.333	1.87	5.400	7.48	8.467	2.18	11.53	1.25

2.367	1.87	5.433	7.48	8.500	2.18	11.57	1.25
2.400	1.87	5.467	7.48	8.533	2.18	11.60	1.25
2.433	1.87	5.500	7.48	8.567	2.18	11.63	1.25
2.467	1.87	5.533	7.48	8.600	2.18	11.67	1.25
2.500	1.87	5.567	7.48	8.633	2.18	11.70	1.25
2.533	1.87	5.600	7.48	8.667	2.18	11.73	1.25
2.567	1.87	5.633	7.48	8.700	2.18	11.77	1.25
2.600	1.87	5.667	7.48	8.733	2.18	11.80	1.25
2.633	1.87	5.700	7.48	8.767	2.18	11.83	1.25
2.667	1.87	5.733	7.48	8.800	2.18	11.87	1.25
2.700	1.87	5.767	18.69	8.833	2.18	11.90	1.25
2.733	1.87	5.800	29.91	8.867	2.18	11.93	1.25
2.767	1.87	5.833	29.91	8.900	2.18	11.97	1.25
2.800	1.87	5.867	29.91	8.933	2.18	12.00	1.25
2.833	1.87	5.900	29.91	8.967	2.18	12.03	1.25
2.867	1.87	5.933	29.91	9.000	2.18	12.07	1.25
2.900	1.87	5.967	29.91	9.033	2.18	12.10	1.25
2.933	1.87	6.000	29.91	9.067	2.18	12.13	1.25
2.967	1.87	6.033	82.26	9.100	2.18	12.17	1.25
3.000	1.87	6.067	82.26	9.133	2.18	12.20	1.25
3.033	1.87	6.100	82.26	9.167	2.18	12.23	1.25
3.067	1.87	6.133	82.26	9.200	2.18	12.27	0.62

Max.Eff.Inten.(mm/hr)=		82.26	32.93	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.26 (ii)	5.97 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.48	0.19	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.021 (iii)
TIME TO PEAK	(hrs)=	6.23	6.27	6.23
RUNOFF VOLUME	(mm)=	60.32	20.40	51.12
TOTAL RAINFALL	(mm)=	62.32	62.32	62.32
RUNOFF COEFFICIENT	=	0.97	0.33	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.87	6.167	82.26	9.23	2.18
0.067	0.00	3.133	1.87	6.200	82.26	9.27	2.18
0.100	0.00	3.167	1.87	6.233	82.26	9.30	2.18
0.133	0.00	3.200	1.87	6.267	46.75	9.33	2.18
0.167	0.00	3.233	1.87	6.300	11.22	9.37	2.18
0.200	0.00	3.267	2.18	6.333	11.22	9.40	2.18
0.233	0.00	3.300	2.49	6.367	11.22	9.43	2.18
0.267	0.78	3.333	2.49	6.400	11.22	9.47	2.18
0.300	1.56	3.367	2.49	6.433	11.22	9.50	2.18
0.333	1.56	3.400	2.49	6.467	11.22	9.53	2.18
0.367	1.56	3.433	2.49	6.500	11.22	9.57	2.18
0.400	1.56	3.467	2.49	6.533	11.22	9.60	2.18
0.433	1.56	3.500	2.49	6.567	11.22	9.63	2.18
0.467	1.56	3.533	2.49	6.600	11.22	9.67	2.18
0.500	1.56	3.567	2.49	6.633	11.22	9.70	2.18
0.533	1.56	3.600	2.49	6.667	11.22	9.73	2.18
0.567	1.56	3.633	2.49	6.700	11.22	9.77	2.18
0.600	1.56	3.667	2.49	6.733	11.22	9.80	2.18
0.633	1.56	3.700	2.49	6.767	8.10	9.83	2.18
0.667	1.56	3.733	2.49	6.800	4.99	9.87	2.18
0.700	1.56	3.767	2.49	6.833	4.99	9.90	2.18
0.733	1.56	3.800	2.49	6.867	4.99	9.93	2.18
0.767	1.56	3.833	2.49	6.900	4.99	9.97	2.18
0.800	1.56	3.867	2.49	6.933	4.99	10.00	2.18
0.833	1.56	3.900	2.49	6.967	4.99	10.03	2.18
0.867	1.56	3.933	2.49	7.000	4.99	10.07	2.18
0.900	1.56	3.967	2.49	7.033	4.99	10.10	2.18
0.933	1.56	4.000	2.49	7.067	4.99	10.13	2.18
0.967	1.56	4.033	2.49	7.100	4.99	10.17	2.18
1.000	1.56	4.067	2.49	7.133	4.99	10.20	2.18
1.033	1.56	4.100	2.49	7.167	4.99	10.23	2.18
1.067	1.56	4.133	2.49	7.200	4.99	10.27	1.71
1.100	1.56	4.167	2.49	7.233	4.99	10.30	1.25
1.133	1.56	4.200	2.49	7.267	4.36	10.33	1.25
1.167	1.56	4.233	2.49	7.300	3.74	10.37	1.25
1.200	1.56	4.267	3.12	7.333	3.74	10.40	1.25

SCS 12 hr_Exsting Conditions

1.233	1.56	4.300	3.74	7.367	3.74	10.43	1.25
1.267	1.56	4.333	3.74	7.400	3.74	10.47	1.25
1.300	1.56	4.367	3.74	7.433	3.74	10.50	1.25
1.333	1.56	4.400	3.74	7.467	3.74	10.53	1.25
1.367	1.56	4.433	3.74	7.500	3.74	10.57	1.25
1.400	1.56	4.467	3.74	7.533	3.74	10.60	1.25
1.433	1.56	4.500	3.74	7.567	3.74	10.63	1.25
1.467	1.56	4.533	3.74	7.600	3.74	10.67	1.25
1.500	1.56	4.567	3.74	7.633	3.74	10.70	1.25
1.533	1.56	4.600	3.74	7.667	3.74	10.73	1.25
1.567	1.56	4.633	3.74	7.700	3.74	10.77	1.25
1.600	1.56	4.667	3.74	7.733	3.74	10.80	1.25
1.633	1.56	4.700	3.74	7.767	3.74	10.83	1.25
1.667	1.56	4.733	3.74	7.800	3.74	10.87	1.25
1.700	1.56	4.767	4.36	7.833	3.74	10.90	1.25
1.733	1.56	4.800	4.99	7.867	3.74	10.93	1.25
1.767	1.56	4.833	4.99	7.900	3.74	10.97	1.25
1.800	1.56	4.867	4.99	7.933	3.74	11.00	1.25
1.833	1.56	4.900	4.99	7.967	3.74	11.03	1.25
1.867	1.56	4.933	4.99	8.000	3.74	11.07	1.25
1.900	1.56	4.967	4.99	8.033	3.74	11.10	1.25
1.933	1.56	5.000	4.99	8.067	3.74	11.13	1.25
1.967	1.56	5.033	4.99	8.100	3.74	11.17	1.25
2.000	1.56	5.067	4.99	8.133	3.74	11.20	1.25
2.033	1.56	5.100	4.99	8.167	3.74	11.23	1.25
2.067	1.56	5.133	4.99	8.200	3.74	11.27	1.25
2.100	1.56	5.167	4.99	8.233	3.74	11.30	1.25
2.133	1.56	5.200	4.99	8.267	2.96	11.33	1.25
2.167	1.56	5.233	4.99	8.300	2.18	11.37	1.25
2.200	1.56	5.267	6.23	8.333	2.18	11.40	1.25
2.233	1.56	5.300	7.48	8.367	2.18	11.43	1.25
2.267	1.71	5.333	7.48	8.400	2.18	11.47	1.25
2.300	1.87	5.367	7.48	8.433	2.18	11.50	1.25
2.333	1.87	5.400	7.48	8.467	2.18	11.53	1.25
2.367	1.87	5.433	7.48	8.500	2.18	11.57	1.25
2.400	1.87	5.467	7.48	8.533	2.18	11.60	1.25
2.433	1.87	5.500	7.48	8.567	2.18	11.63	1.25
2.467	1.87	5.533	7.48	8.600	2.18	11.67	1.25
2.500	1.87	5.567	7.48	8.633	2.18	11.70	1.25
2.533	1.87	5.600	7.48	8.667	2.18	11.73	1.25
2.567	1.87	5.633	7.48	8.700	2.18	11.77	1.25
2.600	1.87	5.667	7.48	8.733	2.18	11.80	1.25
2.633	1.87	5.700	7.48	8.767	2.18	11.83	1.25
2.667	1.87	5.733	7.48	8.800	2.18	11.87	1.25
2.700	1.87	5.767	18.69	8.833	2.18	11.90	1.25
2.733	1.87	5.800	29.91	8.867	2.18	11.93	1.25
2.767	1.87	5.833	29.91	8.900	2.18	11.97	1.25
2.800	1.87	5.867	29.91	8.933	2.18	12.00	1.25
2.833	1.87	5.900	29.91	8.967	2.18	12.03	1.25

SCS 12 hr_Exsting Conditions

2.867	1.87	5.933	29.91	9.000	2.18	12.07	1.25
2.900	1.87	5.967	29.91	9.033	2.18	12.10	1.25
2.933	1.87	6.000	29.91	9.067	2.18	12.13	1.25
2.967	1.87	6.033	82.26	9.100	2.18	12.17	1.25
3.000	1.87	6.067	82.26	9.133	2.18	12.20	1.25
3.033	1.87	6.100	82.26	9.167	2.18	12.23	1.25
3.067	1.87	6.133	82.26	9.200	2.18	12.27	0.62

Max.Eff.Inten.(mm/hr)=		82.26	31.84	
over (min)		5.00	14.00	
Storage Coeff. (min)=		2.21 (ii)	13.36 (ii)	
Unit Hyd. Tpeak (min)=		4.00	14.00	
Unit Hyd. peak (cms)=		0.39	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.06	0.02	0.076 (iii)
TIME TO PEAK	(hrs)=	6.23	6.37	6.23
RUNOFF VOLUME	(mm)=	60.32	20.40	34.76
TOTAL RAINFALL	(mm)=	62.32	62.32	62.32
RUNOFF COEFFICIENT	=	0.97	0.33	0.56

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.076	6.23	34.76
+ ID2= 2 (0120):		0.11	0.021	6.23	51.12
ID = 3 (0122):		0.82	0.098	6.23	36.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0150)	Area (ha)=	0.31			
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)=	54.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00

SCS 12 hr_Exsting Conditions

Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.87	6.167	82.26	9.23	2.18
0.067	0.00	3.133	1.87	6.200	82.26	9.27	2.18
0.100	0.00	3.167	1.87	6.233	82.26	9.30	2.18
0.133	0.00	3.200	1.87	6.267	46.75	9.33	2.18
0.167	0.00	3.233	1.87	6.300	11.22	9.37	2.18
0.200	0.00	3.267	2.18	6.333	11.22	9.40	2.18
0.233	0.00	3.300	2.49	6.367	11.22	9.43	2.18
0.267	0.78	3.333	2.49	6.400	11.22	9.47	2.18
0.300	1.56	3.367	2.49	6.433	11.22	9.50	2.18
0.333	1.56	3.400	2.49	6.467	11.22	9.53	2.18
0.367	1.56	3.433	2.49	6.500	11.22	9.57	2.18
0.400	1.56	3.467	2.49	6.533	11.22	9.60	2.18
0.433	1.56	3.500	2.49	6.567	11.22	9.63	2.18
0.467	1.56	3.533	2.49	6.600	11.22	9.67	2.18
0.500	1.56	3.567	2.49	6.633	11.22	9.70	2.18
0.533	1.56	3.600	2.49	6.667	11.22	9.73	2.18
0.567	1.56	3.633	2.49	6.700	11.22	9.77	2.18
0.600	1.56	3.667	2.49	6.733	11.22	9.80	2.18
0.633	1.56	3.700	2.49	6.767	8.10	9.83	2.18
0.667	1.56	3.733	2.49	6.800	4.99	9.87	2.18
0.700	1.56	3.767	2.49	6.833	4.99	9.90	2.18
0.733	1.56	3.800	2.49	6.867	4.99	9.93	2.18
0.767	1.56	3.833	2.49	6.900	4.99	9.97	2.18
0.800	1.56	3.867	2.49	6.933	4.99	10.00	2.18
0.833	1.56	3.900	2.49	6.967	4.99	10.03	2.18
0.867	1.56	3.933	2.49	7.000	4.99	10.07	2.18
0.900	1.56	3.967	2.49	7.033	4.99	10.10	2.18
0.933	1.56	4.000	2.49	7.067	4.99	10.13	2.18
0.967	1.56	4.033	2.49	7.100	4.99	10.17	2.18
1.000	1.56	4.067	2.49	7.133	4.99	10.20	2.18
1.033	1.56	4.100	2.49	7.167	4.99	10.23	2.18
1.067	1.56	4.133	2.49	7.200	4.99	10.27	1.71
1.100	1.56	4.167	2.49	7.233	4.99	10.30	1.25
1.133	1.56	4.200	2.49	7.267	4.36	10.33	1.25
1.167	1.56	4.233	2.49	7.300	3.74	10.37	1.25
1.200	1.56	4.267	3.12	7.333	3.74	10.40	1.25
1.233	1.56	4.300	3.74	7.367	3.74	10.43	1.25
1.267	1.56	4.333	3.74	7.400	3.74	10.47	1.25
1.300	1.56	4.367	3.74	7.433	3.74	10.50	1.25
1.333	1.56	4.400	3.74	7.467	3.74	10.53	1.25

1.367	1.56	4.433	3.74	7.500	3.74	10.57	1.25
1.400	1.56	4.467	3.74	7.533	3.74	10.60	1.25
1.433	1.56	4.500	3.74	7.567	3.74	10.63	1.25
1.467	1.56	4.533	3.74	7.600	3.74	10.67	1.25
1.500	1.56	4.567	3.74	7.633	3.74	10.70	1.25
1.533	1.56	4.600	3.74	7.667	3.74	10.73	1.25
1.567	1.56	4.633	3.74	7.700	3.74	10.77	1.25
1.600	1.56	4.667	3.74	7.733	3.74	10.80	1.25
1.633	1.56	4.700	3.74	7.767	3.74	10.83	1.25
1.667	1.56	4.733	3.74	7.800	3.74	10.87	1.25
1.700	1.56	4.767	4.36	7.833	3.74	10.90	1.25
1.733	1.56	4.800	4.99	7.867	3.74	10.93	1.25
1.767	1.56	4.833	4.99	7.900	3.74	10.97	1.25
1.800	1.56	4.867	4.99	7.933	3.74	11.00	1.25
1.833	1.56	4.900	4.99	7.967	3.74	11.03	1.25
1.867	1.56	4.933	4.99	8.000	3.74	11.07	1.25
1.900	1.56	4.967	4.99	8.033	3.74	11.10	1.25
1.933	1.56	5.000	4.99	8.067	3.74	11.13	1.25
1.967	1.56	5.033	4.99	8.100	3.74	11.17	1.25
2.000	1.56	5.067	4.99	8.133	3.74	11.20	1.25
2.033	1.56	5.100	4.99	8.167	3.74	11.23	1.25
2.067	1.56	5.133	4.99	8.200	3.74	11.27	1.25
2.100	1.56	5.167	4.99	8.233	3.74	11.30	1.25
2.133	1.56	5.200	4.99	8.267	2.96	11.33	1.25
2.167	1.56	5.233	4.99	8.300	2.18	11.37	1.25
2.200	1.56	5.267	6.23	8.333	2.18	11.40	1.25
2.233	1.56	5.300	7.48	8.367	2.18	11.43	1.25
2.267	1.71	5.333	7.48	8.400	2.18	11.47	1.25
2.300	1.87	5.367	7.48	8.433	2.18	11.50	1.25
2.333	1.87	5.400	7.48	8.467	2.18	11.53	1.25
2.367	1.87	5.433	7.48	8.500	2.18	11.57	1.25
2.400	1.87	5.467	7.48	8.533	2.18	11.60	1.25
2.433	1.87	5.500	7.48	8.567	2.18	11.63	1.25
2.467	1.87	5.533	7.48	8.600	2.18	11.67	1.25
2.500	1.87	5.567	7.48	8.633	2.18	11.70	1.25
2.533	1.87	5.600	7.48	8.667	2.18	11.73	1.25
2.567	1.87	5.633	7.48	8.700	2.18	11.77	1.25
2.600	1.87	5.667	7.48	8.733	2.18	11.80	1.25
2.633	1.87	5.700	7.48	8.767	2.18	11.83	1.25
2.667	1.87	5.733	7.48	8.800	2.18	11.87	1.25
2.700	1.87	5.767	18.69	8.833	2.18	11.90	1.25
2.733	1.87	5.800	29.91	8.867	2.18	11.93	1.25
2.767	1.87	5.833	29.91	8.900	2.18	11.97	1.25
2.800	1.87	5.867	29.91	8.933	2.18	12.00	1.25
2.833	1.87	5.900	29.91	8.967	2.18	12.03	1.25
2.867	1.87	5.933	29.91	9.000	2.18	12.07	1.25
2.900	1.87	5.967	29.91	9.033	2.18	12.10	1.25
2.933	1.87	6.000	29.91	9.067	2.18	12.13	1.25
2.967	1.87	6.033	82.26	9.100	2.18	12.17	1.25

		3.000	1.87	6.067	82.26	9.133	2.18	12.20	1.25
		3.033	1.87	6.100	82.26	9.167	2.18	12.23	1.25
		3.067	1.87	6.133	82.26	9.200	2.18	12.27	0.62

Max.Eff.Inten.(mm/hr)=	82.26	21.62	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.72 (ii)	8.88 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.43	0.12	
			TOTALS
PEAK FLOW (cms)=	0.04	0.01	0.044 (iii)
TIME TO PEAK (hrs)=	6.23	6.30	6.23
RUNOFF VOLUME (mm)=	60.32	13.62	38.82
TOTAL RAINFALL (mm)=	62.32	62.32	62.32
RUNOFF COEFFICIENT =	0.97	0.22	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)=	0.34	
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.87	6.167	82.26	9.23	2.18
0.067	0.00	3.133	1.87	6.200	82.26	9.27	2.18
0.100	0.00	3.167	1.87	6.233	82.26	9.30	2.18
0.133	0.00	3.200	1.87	6.267	46.75	9.33	2.18
0.167	0.00	3.233	1.87	6.300	11.22	9.37	2.18
0.200	0.00	3.267	2.18	6.333	11.22	9.40	2.18

0.233	0.00	3.300	2.49	6.367	11.22	9.43	2.18
0.267	0.78	3.333	2.49	6.400	11.22	9.47	2.18
0.300	1.56	3.367	2.49	6.433	11.22	9.50	2.18
0.333	1.56	3.400	2.49	6.467	11.22	9.53	2.18
0.367	1.56	3.433	2.49	6.500	11.22	9.57	2.18
0.400	1.56	3.467	2.49	6.533	11.22	9.60	2.18
0.433	1.56	3.500	2.49	6.567	11.22	9.63	2.18
0.467	1.56	3.533	2.49	6.600	11.22	9.67	2.18
0.500	1.56	3.567	2.49	6.633	11.22	9.70	2.18
0.533	1.56	3.600	2.49	6.667	11.22	9.73	2.18
0.567	1.56	3.633	2.49	6.700	11.22	9.77	2.18
0.600	1.56	3.667	2.49	6.733	11.22	9.80	2.18
0.633	1.56	3.700	2.49	6.767	8.10	9.83	2.18
0.667	1.56	3.733	2.49	6.800	4.99	9.87	2.18
0.700	1.56	3.767	2.49	6.833	4.99	9.90	2.18
0.733	1.56	3.800	2.49	6.867	4.99	9.93	2.18
0.767	1.56	3.833	2.49	6.900	4.99	9.97	2.18
0.800	1.56	3.867	2.49	6.933	4.99	10.00	2.18
0.833	1.56	3.900	2.49	6.967	4.99	10.03	2.18
0.867	1.56	3.933	2.49	7.000	4.99	10.07	2.18
0.900	1.56	3.967	2.49	7.033	4.99	10.10	2.18
0.933	1.56	4.000	2.49	7.067	4.99	10.13	2.18
0.967	1.56	4.033	2.49	7.100	4.99	10.17	2.18
1.000	1.56	4.067	2.49	7.133	4.99	10.20	2.18
1.033	1.56	4.100	2.49	7.167	4.99	10.23	2.18
1.067	1.56	4.133	2.49	7.200	4.99	10.27	1.71
1.100	1.56	4.167	2.49	7.233	4.99	10.30	1.25
1.133	1.56	4.200	2.49	7.267	4.36	10.33	1.25
1.167	1.56	4.233	2.49	7.300	3.74	10.37	1.25
1.200	1.56	4.267	3.12	7.333	3.74	10.40	1.25
1.233	1.56	4.300	3.74	7.367	3.74	10.43	1.25
1.267	1.56	4.333	3.74	7.400	3.74	10.47	1.25
1.300	1.56	4.367	3.74	7.433	3.74	10.50	1.25
1.333	1.56	4.400	3.74	7.467	3.74	10.53	1.25
1.367	1.56	4.433	3.74	7.500	3.74	10.57	1.25
1.400	1.56	4.467	3.74	7.533	3.74	10.60	1.25
1.433	1.56	4.500	3.74	7.567	3.74	10.63	1.25
1.467	1.56	4.533	3.74	7.600	3.74	10.67	1.25
1.500	1.56	4.567	3.74	7.633	3.74	10.70	1.25
1.533	1.56	4.600	3.74	7.667	3.74	10.73	1.25
1.567	1.56	4.633	3.74	7.700	3.74	10.77	1.25
1.600	1.56	4.667	3.74	7.733	3.74	10.80	1.25
1.633	1.56	4.700	3.74	7.767	3.74	10.83	1.25
1.667	1.56	4.733	3.74	7.800	3.74	10.87	1.25
1.700	1.56	4.767	4.36	7.833	3.74	10.90	1.25
1.733	1.56	4.800	4.99	7.867	3.74	10.93	1.25
1.767	1.56	4.833	4.99	7.900	3.74	10.97	1.25
1.800	1.56	4.867	4.99	7.933	3.74	11.00	1.25
1.833	1.56	4.900	4.99	7.967	3.74	11.03	1.25

1.867	1.56	4.933	4.99	8.000	3.74	11.07	1.25
1.900	1.56	4.967	4.99	8.033	3.74	11.10	1.25
1.933	1.56	5.000	4.99	8.067	3.74	11.13	1.25
1.967	1.56	5.033	4.99	8.100	3.74	11.17	1.25
2.000	1.56	5.067	4.99	8.133	3.74	11.20	1.25
2.033	1.56	5.100	4.99	8.167	3.74	11.23	1.25
2.067	1.56	5.133	4.99	8.200	3.74	11.27	1.25
2.100	1.56	5.167	4.99	8.233	3.74	11.30	1.25
2.133	1.56	5.200	4.99	8.267	2.96	11.33	1.25
2.167	1.56	5.233	4.99	8.300	2.18	11.37	1.25
2.200	1.56	5.267	6.23	8.333	2.18	11.40	1.25
2.233	1.56	5.300	7.48	8.367	2.18	11.43	1.25
2.267	1.71	5.333	7.48	8.400	2.18	11.47	1.25
2.300	1.87	5.367	7.48	8.433	2.18	11.50	1.25
2.333	1.87	5.400	7.48	8.467	2.18	11.53	1.25
2.367	1.87	5.433	7.48	8.500	2.18	11.57	1.25
2.400	1.87	5.467	7.48	8.533	2.18	11.60	1.25
2.433	1.87	5.500	7.48	8.567	2.18	11.63	1.25
2.467	1.87	5.533	7.48	8.600	2.18	11.67	1.25
2.500	1.87	5.567	7.48	8.633	2.18	11.70	1.25
2.533	1.87	5.600	7.48	8.667	2.18	11.73	1.25
2.567	1.87	5.633	7.48	8.700	2.18	11.77	1.25
2.600	1.87	5.667	7.48	8.733	2.18	11.80	1.25
2.633	1.87	5.700	7.48	8.767	2.18	11.83	1.25
2.667	1.87	5.733	7.48	8.800	2.18	11.87	1.25
2.700	1.87	5.767	18.69	8.833	2.18	11.90	1.25
2.733	1.87	5.800	29.91	8.867	2.18	11.93	1.25
2.767	1.87	5.833	29.91	8.900	2.18	11.97	1.25
2.800	1.87	5.867	29.91	8.933	2.18	12.00	1.25
2.833	1.87	5.900	29.91	8.967	2.18	12.03	1.25
2.867	1.87	5.933	29.91	9.000	2.18	12.07	1.25
2.900	1.87	5.967	29.91	9.033	2.18	12.10	1.25
2.933	1.87	6.000	29.91	9.067	2.18	12.13	1.25
2.967	1.87	6.033	82.26	9.100	2.18	12.17	1.25
3.000	1.87	6.067	82.26	9.133	2.18	12.20	1.25
3.033	1.87	6.100	82.26	9.167	2.18	12.23	1.25
3.067	1.87	6.133	82.26	9.200	2.18	12.27	0.62

Max.Eff.Inten.(mm/hr)=	82.26	21.62	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.77 (ii)	7.00 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.43	0.15	
			TOTALS
PEAK FLOW (cms)=	0.06	0.00	0.060 (iii)
TIME TO PEAK (hrs)=	6.23	6.30	6.23
RUNOFF VOLUME (mm)=	60.32	13.62	47.23
TOTAL RAINFALL (mm)=	62.32	62.32	62.32
RUNOFF COEFFICIENT =	0.97	0.22	0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0150):	0.31	0.044	6.23	38.82
+	ID2= 2 (0160):	0.34	0.060	6.23	47.23
	ID = 3 (0162):	0.65	0.104	6.23	43.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0122):	0.82	0.098	6.23	36.95
+	ID2= 2 (0162):	0.65	0.104	6.23	43.22
	ID = 3 (0167):	1.47	0.201	6.23	39.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)=	0.11	
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.87	6.167	82.26	9.23	2.18
0.067	0.00	3.133	1.87	6.200	82.26	9.27	2.18
0.100	0.00	3.167	1.87	6.233	82.26	9.30	2.18
0.133	0.00	3.200	1.87	6.267	46.75	9.33	2.18
0.167	0.00	3.233	1.87	6.300	11.22	9.37	2.18
0.200	0.00	3.267	2.18	6.333	11.22	9.40	2.18
0.233	0.00	3.300	2.49	6.367	11.22	9.43	2.18
0.267	0.78	3.333	2.49	6.400	11.22	9.47	2.18
0.300	1.56	3.367	2.49	6.433	11.22	9.50	2.18
0.333	1.56	3.400	2.49	6.467	11.22	9.53	2.18
0.367	1.56	3.433	2.49	6.500	11.22	9.57	2.18
0.400	1.56	3.467	2.49	6.533	11.22	9.60	2.18
0.433	1.56	3.500	2.49	6.567	11.22	9.63	2.18
0.467	1.56	3.533	2.49	6.600	11.22	9.67	2.18
0.500	1.56	3.567	2.49	6.633	11.22	9.70	2.18
0.533	1.56	3.600	2.49	6.667	11.22	9.73	2.18
0.567	1.56	3.633	2.49	6.700	11.22	9.77	2.18
0.600	1.56	3.667	2.49	6.733	11.22	9.80	2.18
0.633	1.56	3.700	2.49	6.767	8.10	9.83	2.18
0.667	1.56	3.733	2.49	6.800	4.99	9.87	2.18
0.700	1.56	3.767	2.49	6.833	4.99	9.90	2.18
0.733	1.56	3.800	2.49	6.867	4.99	9.93	2.18
0.767	1.56	3.833	2.49	6.900	4.99	9.97	2.18
0.800	1.56	3.867	2.49	6.933	4.99	10.00	2.18
0.833	1.56	3.900	2.49	6.967	4.99	10.03	2.18
0.867	1.56	3.933	2.49	7.000	4.99	10.07	2.18
0.900	1.56	3.967	2.49	7.033	4.99	10.10	2.18
0.933	1.56	4.000	2.49	7.067	4.99	10.13	2.18
0.967	1.56	4.033	2.49	7.100	4.99	10.17	2.18
1.000	1.56	4.067	2.49	7.133	4.99	10.20	2.18
1.033	1.56	4.100	2.49	7.167	4.99	10.23	2.18
1.067	1.56	4.133	2.49	7.200	4.99	10.27	1.71
1.100	1.56	4.167	2.49	7.233	4.99	10.30	1.25
1.133	1.56	4.200	2.49	7.267	4.36	10.33	1.25
1.167	1.56	4.233	2.49	7.300	3.74	10.37	1.25
1.200	1.56	4.267	3.12	7.333	3.74	10.40	1.25
1.233	1.56	4.300	3.74	7.367	3.74	10.43	1.25
1.267	1.56	4.333	3.74	7.400	3.74	10.47	1.25
1.300	1.56	4.367	3.74	7.433	3.74	10.50	1.25
1.333	1.56	4.400	3.74	7.467	3.74	10.53	1.25
1.367	1.56	4.433	3.74	7.500	3.74	10.57	1.25
1.400	1.56	4.467	3.74	7.533	3.74	10.60	1.25
1.433	1.56	4.500	3.74	7.567	3.74	10.63	1.25
1.467	1.56	4.533	3.74	7.600	3.74	10.67	1.25
1.500	1.56	4.567	3.74	7.633	3.74	10.70	1.25
1.533	1.56	4.600	3.74	7.667	3.74	10.73	1.25

1.567	1.56	4.633	3.74	7.700	3.74	10.77	1.25
1.600	1.56	4.667	3.74	7.733	3.74	10.80	1.25
1.633	1.56	4.700	3.74	7.767	3.74	10.83	1.25
1.667	1.56	4.733	3.74	7.800	3.74	10.87	1.25
1.700	1.56	4.767	4.36	7.833	3.74	10.90	1.25
1.733	1.56	4.800	4.99	7.867	3.74	10.93	1.25
1.767	1.56	4.833	4.99	7.900	3.74	10.97	1.25
1.800	1.56	4.867	4.99	7.933	3.74	11.00	1.25
1.833	1.56	4.900	4.99	7.967	3.74	11.03	1.25
1.867	1.56	4.933	4.99	8.000	3.74	11.07	1.25
1.900	1.56	4.967	4.99	8.033	3.74	11.10	1.25
1.933	1.56	5.000	4.99	8.067	3.74	11.13	1.25
1.967	1.56	5.033	4.99	8.100	3.74	11.17	1.25
2.000	1.56	5.067	4.99	8.133	3.74	11.20	1.25
2.033	1.56	5.100	4.99	8.167	3.74	11.23	1.25
2.067	1.56	5.133	4.99	8.200	3.74	11.27	1.25
2.100	1.56	5.167	4.99	8.233	3.74	11.30	1.25
2.133	1.56	5.200	4.99	8.267	2.96	11.33	1.25
2.167	1.56	5.233	4.99	8.300	2.18	11.37	1.25
2.200	1.56	5.267	6.23	8.333	2.18	11.40	1.25
2.233	1.56	5.300	7.48	8.367	2.18	11.43	1.25
2.267	1.71	5.333	7.48	8.400	2.18	11.47	1.25
2.300	1.87	5.367	7.48	8.433	2.18	11.50	1.25
2.333	1.87	5.400	7.48	8.467	2.18	11.53	1.25
2.367	1.87	5.433	7.48	8.500	2.18	11.57	1.25
2.400	1.87	5.467	7.48	8.533	2.18	11.60	1.25
2.433	1.87	5.500	7.48	8.567	2.18	11.63	1.25
2.467	1.87	5.533	7.48	8.600	2.18	11.67	1.25
2.500	1.87	5.567	7.48	8.633	2.18	11.70	1.25
2.533	1.87	5.600	7.48	8.667	2.18	11.73	1.25
2.567	1.87	5.633	7.48	8.700	2.18	11.77	1.25
2.600	1.87	5.667	7.48	8.733	2.18	11.80	1.25
2.633	1.87	5.700	7.48	8.767	2.18	11.83	1.25
2.667	1.87	5.733	7.48	8.800	2.18	11.87	1.25
2.700	1.87	5.767	18.69	8.833	2.18	11.90	1.25
2.733	1.87	5.800	29.91	8.867	2.18	11.93	1.25
2.767	1.87	5.833	29.91	8.900	2.18	11.97	1.25
2.800	1.87	5.867	29.91	8.933	2.18	12.00	1.25
2.833	1.87	5.900	29.91	8.967	2.18	12.03	1.25
2.867	1.87	5.933	29.91	9.000	2.18	12.07	1.25
2.900	1.87	5.967	29.91	9.033	2.18	12.10	1.25
2.933	1.87	6.000	29.91	9.067	2.18	12.13	1.25
2.967	1.87	6.033	82.26	9.100	2.18	12.17	1.25
3.000	1.87	6.067	82.26	9.133	2.18	12.20	1.25
3.033	1.87	6.100	82.26	9.167	2.18	12.23	1.25
3.067	1.87	6.133	82.26	9.200	2.18	12.27	0.62

Max.Eff.Inten.(mm/hr)=	82.26	21.62	
over (min)	5.00	8.00	

Storage Coeff. (min)=	1.26 (ii)	6.07 (ii)		
Unit Hyd. Tpeak (min)=	4.00	8.00		
Unit Hyd. peak (cms)=	0.48	0.17		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.020 (iii)	
TIME TO PEAK (hrs)=	6.23	6.30	6.23	
RUNOFF VOLUME (mm)=	60.32	13.62	49.10	
TOTAL RAINFALL (mm)=	62.32	62.32	62.32	
RUNOFF COEFFICIENT =	0.97	0.22	0.79	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

V V I SSSSS U U A L (v 6.2.2020)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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***** DETAILED OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
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Summary filename:
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DATE: 01-16-2026 TIME: 04:29:25

USER:

COMMENTS: _____

SIMULATION : 12hr SCS 25yr

READ STORM | Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\91c84e44-e32d-4dda-9fa8-0b4aecedc8e1\c0167a82
Ptotal= 72.89 mm | Comments: 12hr SCS 25yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	2.92	6.50	13.12	9.75	2.55
0.25	1.82	3.50	2.92	6.75	5.83	10.00	2.55
0.50	1.82	3.75	2.92	7.00	5.83	10.25	1.46
0.75	1.82	4.00	2.92	7.25	4.37	10.50	1.46
1.00	1.82	4.25	4.37	7.50	4.37	10.75	1.46
1.25	1.82	4.50	4.37	7.75	4.37	11.00	1.46
1.50	1.82	4.75	5.83	8.00	4.37	11.25	1.46
1.75	1.82	5.00	5.83	8.25	2.55	11.50	1.46
2.00	1.82	5.25	8.75	8.50	2.55	11.75	1.46
2.25	2.19	5.50	8.75	8.75	2.55	12.00	1.46
2.50	2.19	5.75	34.99	9.00	2.55		
2.75	2.19	6.00	96.21	9.25	2.55		
3.00	2.19	6.25	13.12	9.50	2.55		

CALIB
STANDHYD (0120) | Area (ha)= 0.11
ID= 1 DT= 2.0 min | Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.19	6.167	96.21	9.23	2.55
0.067	0.00	3.133	2.19	6.200	96.21	9.27	2.55
0.100	0.00	3.167	2.19	6.233	96.21	9.30	2.55
0.133	0.00	3.200	2.19	6.267	54.68	9.33	2.55
0.167	0.00	3.233	2.19	6.300	13.12	9.37	2.55
0.200	0.00	3.267	2.55	6.333	13.12	9.40	2.55
0.233	0.00	3.300	2.92	6.367	13.12	9.43	2.55
0.267	0.91	3.333	2.92	6.400	13.12	9.47	2.55
0.300	1.82	3.367	2.92	6.433	13.12	9.50	2.55
0.333	1.82	3.400	2.92	6.467	13.12	9.53	2.55
0.367	1.82	3.433	2.92	6.500	13.12	9.57	2.55
0.400	1.82	3.467	2.92	6.533	13.12	9.60	2.55
0.433	1.82	3.500	2.92	6.567	13.12	9.63	2.55
0.467	1.82	3.533	2.92	6.600	13.12	9.67	2.55
0.500	1.82	3.567	2.92	6.633	13.12	9.70	2.55
0.533	1.82	3.600	2.92	6.667	13.12	9.73	2.55
0.567	1.82	3.633	2.92	6.700	13.12	9.77	2.55
0.600	1.82	3.667	2.92	6.733	13.12	9.80	2.55
0.633	1.82	3.700	2.92	6.767	9.48	9.83	2.55
0.667	1.82	3.733	2.92	6.800	5.83	9.87	2.55
0.700	1.82	3.767	2.92	6.833	5.83	9.90	2.55
0.733	1.82	3.800	2.92	6.867	5.83	9.93	2.55
0.767	1.82	3.833	2.92	6.900	5.83	9.97	2.55
0.800	1.82	3.867	2.92	6.933	5.83	10.00	2.55
0.833	1.82	3.900	2.92	6.967	5.83	10.03	2.55
0.867	1.82	3.933	2.92	7.000	5.83	10.07	2.55
0.900	1.82	3.967	2.92	7.033	5.83	10.10	2.55
0.933	1.82	4.000	2.92	7.067	5.83	10.13	2.55
0.967	1.82	4.033	2.92	7.100	5.83	10.17	2.55
1.000	1.82	4.067	2.92	7.133	5.83	10.20	2.55
1.033	1.82	4.100	2.92	7.167	5.83	10.23	2.55
1.067	1.82	4.133	2.92	7.200	5.83	10.27	2.00
1.100	1.82	4.167	2.92	7.233	5.83	10.30	1.46
1.133	1.82	4.200	2.92	7.267	5.10	10.33	1.46
1.167	1.82	4.233	2.92	7.300	4.37	10.37	1.46
1.200	1.82	4.267	3.64	7.333	4.37	10.40	1.46
1.233	1.82	4.300	4.37	7.367	4.37	10.43	1.46
1.267	1.82	4.333	4.37	7.400	4.37	10.47	1.46
1.300	1.82	4.367	4.37	7.433	4.37	10.50	1.46

1.333	1.82	4.400	4.37	7.467	4.37	10.53	1.46
1.367	1.82	4.433	4.37	7.500	4.37	10.57	1.46
1.400	1.82	4.467	4.37	7.533	4.37	10.60	1.46
1.433	1.82	4.500	4.37	7.567	4.37	10.63	1.46
1.467	1.82	4.533	4.37	7.600	4.37	10.67	1.46
1.500	1.82	4.567	4.37	7.633	4.37	10.70	1.46
1.533	1.82	4.600	4.37	7.667	4.37	10.73	1.46
1.567	1.82	4.633	4.37	7.700	4.37	10.77	1.46
1.600	1.82	4.667	4.37	7.733	4.37	10.80	1.46
1.633	1.82	4.700	4.37	7.767	4.37	10.83	1.46
1.667	1.82	4.733	4.37	7.800	4.37	10.87	1.46
1.700	1.82	4.767	5.10	7.833	4.37	10.90	1.46
1.733	1.82	4.800	5.83	7.867	4.37	10.93	1.46
1.767	1.82	4.833	5.83	7.900	4.37	10.97	1.46
1.800	1.82	4.867	5.83	7.933	4.37	11.00	1.46
1.833	1.82	4.900	5.83	7.967	4.37	11.03	1.46
1.867	1.82	4.933	5.83	8.000	4.37	11.07	1.46
1.900	1.82	4.967	5.83	8.033	4.37	11.10	1.46
1.933	1.82	5.000	5.83	8.067	4.37	11.13	1.46
1.967	1.82	5.033	5.83	8.100	4.37	11.17	1.46
2.000	1.82	5.067	5.83	8.133	4.37	11.20	1.46
2.033	1.82	5.100	5.83	8.167	4.37	11.23	1.46
2.067	1.82	5.133	5.83	8.200	4.37	11.27	1.46
2.100	1.82	5.167	5.83	8.233	4.37	11.30	1.46
2.133	1.82	5.200	5.83	8.267	3.46	11.33	1.46
2.167	1.82	5.233	5.83	8.300	2.55	11.37	1.46
2.200	1.82	5.267	7.29	8.333	2.55	11.40	1.46
2.233	1.82	5.300	8.75	8.367	2.55	11.43	1.46
2.267	2.00	5.333	8.75	8.400	2.55	11.47	1.46
2.300	2.19	5.367	8.75	8.433	2.55	11.50	1.46
2.333	2.19	5.400	8.75	8.467	2.55	11.53	1.46
2.367	2.19	5.433	8.75	8.500	2.55	11.57	1.46
2.400	2.19	5.467	8.75	8.533	2.55	11.60	1.46
2.433	2.19	5.500	8.75	8.567	2.55	11.63	1.46
2.467	2.19	5.533	8.75	8.600	2.55	11.67	1.46
2.500	2.19	5.567	8.75	8.633	2.55	11.70	1.46
2.533	2.19	5.600	8.75	8.667	2.55	11.73	1.46
2.567	2.19	5.633	8.75	8.700	2.55	11.77	1.46
2.600	2.19	5.667	8.75	8.733	2.55	11.80	1.46
2.633	2.19	5.700	8.75	8.767	2.55	11.83	1.46
2.667	2.19	5.733	8.75	8.800	2.55	11.87	1.46
2.700	2.19	5.767	21.86	8.833	2.55	11.90	1.46
2.733	2.19	5.800	34.99	8.867	2.55	11.93	1.46
2.767	2.19	5.833	34.99	8.900	2.55	11.97	1.46
2.800	2.19	5.867	34.99	8.933	2.55	12.00	1.46
2.833	2.19	5.900	34.99	8.967	2.55	12.03	1.46
2.867	2.19	5.933	34.99	9.000	2.55	12.07	1.46
2.900	2.19	5.967	34.99	9.033	2.55	12.10	1.46
2.933	2.19	6.000	34.99	9.067	2.55	12.13	1.46

2.967	2.19	6.033	96.21	9.100	2.55	12.17	1.46
3.000	2.19	6.067	96.21	9.133	2.55	12.20	1.46
3.033	2.19	6.100	96.21	9.167	2.55	12.23	1.46
3.067	2.19	6.133	96.21	9.200	2.55	12.27	0.73

Max.Eff.Inten.(mm/hr)=		96.21	43.32	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.18 (ii)	5.61 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.49	0.20	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.025 (iii)
TIME TO PEAK	(hrs)=	6.23	6.27	6.23
RUNOFF VOLUME	(mm)=	70.89	26.85	60.74
TOTAL RAINFALL	(mm)=	72.89	72.89	72.89
RUNOFF COEFFICIENT	=	0.97	0.37	0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0110) | Area (ha)= 0.71
ID= 1 DT= 2.0 min | Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.19	6.167	96.21	9.23	2.55
0.067	0.00	3.133	2.19	6.200	96.21	9.27	2.55
0.100	0.00	3.167	2.19	6.233	96.21	9.30	2.55
0.133	0.00	3.200	2.19	6.267	54.68	9.33	2.55
0.167	0.00	3.233	2.19	6.300	13.12	9.37	2.55

0.200	0.00	3.267	2.55	6.333	13.12	9.40	2.55
0.233	0.00	3.300	2.92	6.367	13.12	9.43	2.55
0.267	0.91	3.333	2.92	6.400	13.12	9.47	2.55
0.300	1.82	3.367	2.92	6.433	13.12	9.50	2.55
0.333	1.82	3.400	2.92	6.467	13.12	9.53	2.55
0.367	1.82	3.433	2.92	6.500	13.12	9.57	2.55
0.400	1.82	3.467	2.92	6.533	13.12	9.60	2.55
0.433	1.82	3.500	2.92	6.567	13.12	9.63	2.55
0.467	1.82	3.533	2.92	6.600	13.12	9.67	2.55
0.500	1.82	3.567	2.92	6.633	13.12	9.70	2.55
0.533	1.82	3.600	2.92	6.667	13.12	9.73	2.55
0.567	1.82	3.633	2.92	6.700	13.12	9.77	2.55
0.600	1.82	3.667	2.92	6.733	13.12	9.80	2.55
0.633	1.82	3.700	2.92	6.767	9.48	9.83	2.55
0.667	1.82	3.733	2.92	6.800	5.83	9.87	2.55
0.700	1.82	3.767	2.92	6.833	5.83	9.90	2.55
0.733	1.82	3.800	2.92	6.867	5.83	9.93	2.55
0.767	1.82	3.833	2.92	6.900	5.83	9.97	2.55
0.800	1.82	3.867	2.92	6.933	5.83	10.00	2.55
0.833	1.82	3.900	2.92	6.967	5.83	10.03	2.55
0.867	1.82	3.933	2.92	7.000	5.83	10.07	2.55
0.900	1.82	3.967	2.92	7.033	5.83	10.10	2.55
0.933	1.82	4.000	2.92	7.067	5.83	10.13	2.55
0.967	1.82	4.033	2.92	7.100	5.83	10.17	2.55
1.000	1.82	4.067	2.92	7.133	5.83	10.20	2.55
1.033	1.82	4.100	2.92	7.167	5.83	10.23	2.55
1.067	1.82	4.133	2.92	7.200	5.83	10.27	2.00
1.100	1.82	4.167	2.92	7.233	5.83	10.30	1.46
1.133	1.82	4.200	2.92	7.267	5.10	10.33	1.46
1.167	1.82	4.233	2.92	7.300	4.37	10.37	1.46
1.200	1.82	4.267	3.64	7.333	4.37	10.40	1.46
1.233	1.82	4.300	4.37	7.367	4.37	10.43	1.46
1.267	1.82	4.333	4.37	7.400	4.37	10.47	1.46
1.300	1.82	4.367	4.37	7.433	4.37	10.50	1.46
1.333	1.82	4.400	4.37	7.467	4.37	10.53	1.46
1.367	1.82	4.433	4.37	7.500	4.37	10.57	1.46
1.400	1.82	4.467	4.37	7.533	4.37	10.60	1.46
1.433	1.82	4.500	4.37	7.567	4.37	10.63	1.46
1.467	1.82	4.533	4.37	7.600	4.37	10.67	1.46
1.500	1.82	4.567	4.37	7.633	4.37	10.70	1.46
1.533	1.82	4.600	4.37	7.667	4.37	10.73	1.46
1.567	1.82	4.633	4.37	7.700	4.37	10.77	1.46
1.600	1.82	4.667	4.37	7.733	4.37	10.80	1.46
1.633	1.82	4.700	4.37	7.767	4.37	10.83	1.46
1.667	1.82	4.733	4.37	7.800	4.37	10.87	1.46
1.700	1.82	4.767	5.10	7.833	4.37	10.90	1.46
1.733	1.82	4.800	5.83	7.867	4.37	10.93	1.46
1.767	1.82	4.833	5.83	7.900	4.37	10.97	1.46
1.800	1.82	4.867	5.83	7.933	4.37	11.00	1.46

1.833	1.82	4.900	5.83	7.967	4.37	11.03	1.46
1.867	1.82	4.933	5.83	8.000	4.37	11.07	1.46
1.900	1.82	4.967	5.83	8.033	4.37	11.10	1.46
1.933	1.82	5.000	5.83	8.067	4.37	11.13	1.46
1.967	1.82	5.033	5.83	8.100	4.37	11.17	1.46
2.000	1.82	5.067	5.83	8.133	4.37	11.20	1.46
2.033	1.82	5.100	5.83	8.167	4.37	11.23	1.46
2.067	1.82	5.133	5.83	8.200	4.37	11.27	1.46
2.100	1.82	5.167	5.83	8.233	4.37	11.30	1.46
2.133	1.82	5.200	5.83	8.267	3.46	11.33	1.46
2.167	1.82	5.233	5.83	8.300	2.55	11.37	1.46
2.200	1.82	5.267	7.29	8.333	2.55	11.40	1.46
2.233	1.82	5.300	8.75	8.367	2.55	11.43	1.46
2.267	2.00	5.333	8.75	8.400	2.55	11.47	1.46
2.300	2.19	5.367	8.75	8.433	2.55	11.50	1.46
2.333	2.19	5.400	8.75	8.467	2.55	11.53	1.46
2.367	2.19	5.433	8.75	8.500	2.55	11.57	1.46
2.400	2.19	5.467	8.75	8.533	2.55	11.60	1.46
2.433	2.19	5.500	8.75	8.567	2.55	11.63	1.46
2.467	2.19	5.533	8.75	8.600	2.55	11.67	1.46
2.500	2.19	5.567	8.75	8.633	2.55	11.70	1.46
2.533	2.19	5.600	8.75	8.667	2.55	11.73	1.46
2.567	2.19	5.633	8.75	8.700	2.55	11.77	1.46
2.600	2.19	5.667	8.75	8.733	2.55	11.80	1.46
2.633	2.19	5.700	8.75	8.767	2.55	11.83	1.46
2.667	2.19	5.733	8.75	8.800	2.55	11.87	1.46
2.700	2.19	5.767	21.86	8.833	2.55	11.90	1.46
2.733	2.19	5.800	34.99	8.867	2.55	11.93	1.46
2.767	2.19	5.833	34.99	8.900	2.55	11.97	1.46
2.800	2.19	5.867	34.99	8.933	2.55	12.00	1.46
2.833	2.19	5.900	34.99	8.967	2.55	12.03	1.46
2.867	2.19	5.933	34.99	9.000	2.55	12.07	1.46
2.900	2.19	5.967	34.99	9.033	2.55	12.10	1.46
2.933	2.19	6.000	34.99	9.067	2.55	12.13	1.46
2.967	2.19	6.033	96.21	9.100	2.55	12.17	1.46
3.000	2.19	6.067	96.21	9.133	2.55	12.20	1.46
3.033	2.19	6.100	96.21	9.167	2.55	12.23	1.46
3.067	2.19	6.133	96.21	9.200	2.55	12.27	0.73

Max.Eff.Inten.(mm/hr)=		96.21	43.32	
over (min)		5.00	12.00	
Storage Coeff. (min)=		2.07 (ii)	11.94 (ii)	
Unit Hyd. Tpeak (min)=		4.00	12.00	
Unit Hyd. peak (cms)=		0.40	0.09	
				TOTALS
PEAK FLOW	(cms)=	0.07	0.04	0.097 (iii)
TIME TO PEAK	(hrs)=	6.23	6.33	6.23
RUNOFF VOLUME	(mm)=	70.89	26.85	42.70
TOTAL RAINFALL	(mm)=	72.89	72.89	72.89

RUNOFF COEFFICIENT = 0.97 0.37 0.59

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.097	6.23	42.70
+ ID2= 2 (0120):		0.11	0.025	6.23	60.74
ID = 3 (0122):		0.82	0.122	6.23	45.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)=	0.31	
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.19	6.167	96.21	9.23	2.55
0.067	0.00	3.133	2.19	6.200	96.21	9.27	2.55
0.100	0.00	3.167	2.19	6.233	96.21	9.30	2.55
0.133	0.00	3.200	2.19	6.267	54.68	9.33	2.55
0.167	0.00	3.233	2.19	6.300	13.12	9.37	2.55
0.200	0.00	3.267	2.55	6.333	13.12	9.40	2.55
0.233	0.00	3.300	2.92	6.367	13.12	9.43	2.55
0.267	0.91	3.333	2.92	6.400	13.12	9.47	2.55
0.300	1.82	3.367	2.92	6.433	13.12	9.50	2.55

0.333	1.82	3.400	2.92	6.467	13.12	9.53	2.55
0.367	1.82	3.433	2.92	6.500	13.12	9.57	2.55
0.400	1.82	3.467	2.92	6.533	13.12	9.60	2.55
0.433	1.82	3.500	2.92	6.567	13.12	9.63	2.55
0.467	1.82	3.533	2.92	6.600	13.12	9.67	2.55
0.500	1.82	3.567	2.92	6.633	13.12	9.70	2.55
0.533	1.82	3.600	2.92	6.667	13.12	9.73	2.55
0.567	1.82	3.633	2.92	6.700	13.12	9.77	2.55
0.600	1.82	3.667	2.92	6.733	13.12	9.80	2.55
0.633	1.82	3.700	2.92	6.767	9.48	9.83	2.55
0.667	1.82	3.733	2.92	6.800	5.83	9.87	2.55
0.700	1.82	3.767	2.92	6.833	5.83	9.90	2.55
0.733	1.82	3.800	2.92	6.867	5.83	9.93	2.55
0.767	1.82	3.833	2.92	6.900	5.83	9.97	2.55
0.800	1.82	3.867	2.92	6.933	5.83	10.00	2.55
0.833	1.82	3.900	2.92	6.967	5.83	10.03	2.55
0.867	1.82	3.933	2.92	7.000	5.83	10.07	2.55
0.900	1.82	3.967	2.92	7.033	5.83	10.10	2.55
0.933	1.82	4.000	2.92	7.067	5.83	10.13	2.55
0.967	1.82	4.033	2.92	7.100	5.83	10.17	2.55
1.000	1.82	4.067	2.92	7.133	5.83	10.20	2.55
1.033	1.82	4.100	2.92	7.167	5.83	10.23	2.55
1.067	1.82	4.133	2.92	7.200	5.83	10.27	2.00
1.100	1.82	4.167	2.92	7.233	5.83	10.30	1.46
1.133	1.82	4.200	2.92	7.267	5.10	10.33	1.46
1.167	1.82	4.233	2.92	7.300	4.37	10.37	1.46
1.200	1.82	4.267	3.64	7.333	4.37	10.40	1.46
1.233	1.82	4.300	4.37	7.367	4.37	10.43	1.46
1.267	1.82	4.333	4.37	7.400	4.37	10.47	1.46
1.300	1.82	4.367	4.37	7.433	4.37	10.50	1.46
1.333	1.82	4.400	4.37	7.467	4.37	10.53	1.46
1.367	1.82	4.433	4.37	7.500	4.37	10.57	1.46
1.400	1.82	4.467	4.37	7.533	4.37	10.60	1.46
1.433	1.82	4.500	4.37	7.567	4.37	10.63	1.46
1.467	1.82	4.533	4.37	7.600	4.37	10.67	1.46
1.500	1.82	4.567	4.37	7.633	4.37	10.70	1.46
1.533	1.82	4.600	4.37	7.667	4.37	10.73	1.46
1.567	1.82	4.633	4.37	7.700	4.37	10.77	1.46
1.600	1.82	4.667	4.37	7.733	4.37	10.80	1.46
1.633	1.82	4.700	4.37	7.767	4.37	10.83	1.46
1.667	1.82	4.733	4.37	7.800	4.37	10.87	1.46
1.700	1.82	4.767	5.10	7.833	4.37	10.90	1.46
1.733	1.82	4.800	5.83	7.867	4.37	10.93	1.46
1.767	1.82	4.833	5.83	7.900	4.37	10.97	1.46
1.800	1.82	4.867	5.83	7.933	4.37	11.00	1.46
1.833	1.82	4.900	5.83	7.967	4.37	11.03	1.46
1.867	1.82	4.933	5.83	8.000	4.37	11.07	1.46
1.900	1.82	4.967	5.83	8.033	4.37	11.10	1.46
1.933	1.82	5.000	5.83	8.067	4.37	11.13	1.46

1.967	1.82	5.033	5.83	8.100	4.37	11.17	1.46
2.000	1.82	5.067	5.83	8.133	4.37	11.20	1.46
2.033	1.82	5.100	5.83	8.167	4.37	11.23	1.46
2.067	1.82	5.133	5.83	8.200	4.37	11.27	1.46
2.100	1.82	5.167	5.83	8.233	4.37	11.30	1.46
2.133	1.82	5.200	5.83	8.267	3.46	11.33	1.46
2.167	1.82	5.233	5.83	8.300	2.55	11.37	1.46
2.200	1.82	5.267	7.29	8.333	2.55	11.40	1.46
2.233	1.82	5.300	8.75	8.367	2.55	11.43	1.46
2.267	2.00	5.333	8.75	8.400	2.55	11.47	1.46
2.300	2.19	5.367	8.75	8.433	2.55	11.50	1.46
2.333	2.19	5.400	8.75	8.467	2.55	11.53	1.46
2.367	2.19	5.433	8.75	8.500	2.55	11.57	1.46
2.400	2.19	5.467	8.75	8.533	2.55	11.60	1.46
2.433	2.19	5.500	8.75	8.567	2.55	11.63	1.46
2.467	2.19	5.533	8.75	8.600	2.55	11.67	1.46
2.500	2.19	5.567	8.75	8.633	2.55	11.70	1.46
2.533	2.19	5.600	8.75	8.667	2.55	11.73	1.46
2.567	2.19	5.633	8.75	8.700	2.55	11.77	1.46
2.600	2.19	5.667	8.75	8.733	2.55	11.80	1.46
2.633	2.19	5.700	8.75	8.767	2.55	11.83	1.46
2.667	2.19	5.733	8.75	8.800	2.55	11.87	1.46
2.700	2.19	5.767	21.86	8.833	2.55	11.90	1.46
2.733	2.19	5.800	34.99	8.867	2.55	11.93	1.46
2.767	2.19	5.833	34.99	8.900	2.55	11.97	1.46
2.800	2.19	5.867	34.99	8.933	2.55	12.00	1.46
2.833	2.19	5.900	34.99	8.967	2.55	12.03	1.46
2.867	2.19	5.933	34.99	9.000	2.55	12.07	1.46
2.900	2.19	5.967	34.99	9.033	2.55	12.10	1.46
2.933	2.19	6.000	34.99	9.067	2.55	12.13	1.46
2.967	2.19	6.033	96.21	9.100	2.55	12.17	1.46
3.000	2.19	6.067	96.21	9.133	2.55	12.20	1.46
3.033	2.19	6.100	96.21	9.167	2.55	12.23	1.46
3.067	2.19	6.133	96.21	9.200	2.55	12.27	0.73

Max.Eff.Inten.(mm/hr)=	96.21	29.08	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.62 (ii)	8.34 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.45	0.13	
			TOTALS
PEAK FLOW (cms)=	0.04	0.01	0.052 (iii)
TIME TO PEAK (hrs)=	6.23	6.30	6.23
RUNOFF VOLUME (mm)=	70.89	18.30	46.68
TOTAL RAINFALL (mm)=	72.89	72.89	72.89
RUNOFF COEFFICIENT =	0.97	0.25	0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)=	0.34	
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.19	6.167	96.21	9.23	2.55
0.067	0.00	3.133	2.19	6.200	96.21	9.27	2.55
0.100	0.00	3.167	2.19	6.233	96.21	9.30	2.55
0.133	0.00	3.200	2.19	6.267	54.68	9.33	2.55
0.167	0.00	3.233	2.19	6.300	13.12	9.37	2.55
0.200	0.00	3.267	2.55	6.333	13.12	9.40	2.55
0.233	0.00	3.300	2.92	6.367	13.12	9.43	2.55
0.267	0.91	3.333	2.92	6.400	13.12	9.47	2.55
0.300	1.82	3.367	2.92	6.433	13.12	9.50	2.55
0.333	1.82	3.400	2.92	6.467	13.12	9.53	2.55
0.367	1.82	3.433	2.92	6.500	13.12	9.57	2.55
0.400	1.82	3.467	2.92	6.533	13.12	9.60	2.55
0.433	1.82	3.500	2.92	6.567	13.12	9.63	2.55
0.467	1.82	3.533	2.92	6.600	13.12	9.67	2.55
0.500	1.82	3.567	2.92	6.633	13.12	9.70	2.55
0.533	1.82	3.600	2.92	6.667	13.12	9.73	2.55
0.567	1.82	3.633	2.92	6.700	13.12	9.77	2.55
0.600	1.82	3.667	2.92	6.733	13.12	9.80	2.55
0.633	1.82	3.700	2.92	6.767	9.48	9.83	2.55
0.667	1.82	3.733	2.92	6.800	5.83	9.87	2.55
0.700	1.82	3.767	2.92	6.833	5.83	9.90	2.55
0.733	1.82	3.800	2.92	6.867	5.83	9.93	2.55
0.767	1.82	3.833	2.92	6.900	5.83	9.97	2.55
0.800	1.82	3.867	2.92	6.933	5.83	10.00	2.55

0.833	1.82	3.900	2.92	6.967	5.83	10.03	2.55
0.867	1.82	3.933	2.92	7.000	5.83	10.07	2.55
0.900	1.82	3.967	2.92	7.033	5.83	10.10	2.55
0.933	1.82	4.000	2.92	7.067	5.83	10.13	2.55
0.967	1.82	4.033	2.92	7.100	5.83	10.17	2.55
1.000	1.82	4.067	2.92	7.133	5.83	10.20	2.55
1.033	1.82	4.100	2.92	7.167	5.83	10.23	2.55
1.067	1.82	4.133	2.92	7.200	5.83	10.27	2.00
1.100	1.82	4.167	2.92	7.233	5.83	10.30	1.46
1.133	1.82	4.200	2.92	7.267	5.10	10.33	1.46
1.167	1.82	4.233	2.92	7.300	4.37	10.37	1.46
1.200	1.82	4.267	3.64	7.333	4.37	10.40	1.46
1.233	1.82	4.300	4.37	7.367	4.37	10.43	1.46
1.267	1.82	4.333	4.37	7.400	4.37	10.47	1.46
1.300	1.82	4.367	4.37	7.433	4.37	10.50	1.46
1.333	1.82	4.400	4.37	7.467	4.37	10.53	1.46
1.367	1.82	4.433	4.37	7.500	4.37	10.57	1.46
1.400	1.82	4.467	4.37	7.533	4.37	10.60	1.46
1.433	1.82	4.500	4.37	7.567	4.37	10.63	1.46
1.467	1.82	4.533	4.37	7.600	4.37	10.67	1.46
1.500	1.82	4.567	4.37	7.633	4.37	10.70	1.46
1.533	1.82	4.600	4.37	7.667	4.37	10.73	1.46
1.567	1.82	4.633	4.37	7.700	4.37	10.77	1.46
1.600	1.82	4.667	4.37	7.733	4.37	10.80	1.46
1.633	1.82	4.700	4.37	7.767	4.37	10.83	1.46
1.667	1.82	4.733	4.37	7.800	4.37	10.87	1.46
1.700	1.82	4.767	5.10	7.833	4.37	10.90	1.46
1.733	1.82	4.800	5.83	7.867	4.37	10.93	1.46
1.767	1.82	4.833	5.83	7.900	4.37	10.97	1.46
1.800	1.82	4.867	5.83	7.933	4.37	11.00	1.46
1.833	1.82	4.900	5.83	7.967	4.37	11.03	1.46
1.867	1.82	4.933	5.83	8.000	4.37	11.07	1.46
1.900	1.82	4.967	5.83	8.033	4.37	11.10	1.46
1.933	1.82	5.000	5.83	8.067	4.37	11.13	1.46
1.967	1.82	5.033	5.83	8.100	4.37	11.17	1.46
2.000	1.82	5.067	5.83	8.133	4.37	11.20	1.46
2.033	1.82	5.100	5.83	8.167	4.37	11.23	1.46
2.067	1.82	5.133	5.83	8.200	4.37	11.27	1.46
2.100	1.82	5.167	5.83	8.233	4.37	11.30	1.46
2.133	1.82	5.200	5.83	8.267	3.46	11.33	1.46
2.167	1.82	5.233	5.83	8.300	2.55	11.37	1.46
2.200	1.82	5.267	7.29	8.333	2.55	11.40	1.46
2.233	1.82	5.300	8.75	8.367	2.55	11.43	1.46
2.267	2.00	5.333	8.75	8.400	2.55	11.47	1.46
2.300	2.19	5.367	8.75	8.433	2.55	11.50	1.46
2.333	2.19	5.400	8.75	8.467	2.55	11.53	1.46
2.367	2.19	5.433	8.75	8.500	2.55	11.57	1.46
2.400	2.19	5.467	8.75	8.533	2.55	11.60	1.46
2.433	2.19	5.500	8.75	8.567	2.55	11.63	1.46

2.467	2.19	5.533	8.75	8.600	2.55	11.67	1.46
2.500	2.19	5.567	8.75	8.633	2.55	11.70	1.46
2.533	2.19	5.600	8.75	8.667	2.55	11.73	1.46
2.567	2.19	5.633	8.75	8.700	2.55	11.77	1.46
2.600	2.19	5.667	8.75	8.733	2.55	11.80	1.46
2.633	2.19	5.700	8.75	8.767	2.55	11.83	1.46
2.667	2.19	5.733	8.75	8.800	2.55	11.87	1.46
2.700	2.19	5.767	21.86	8.833	2.55	11.90	1.46
2.733	2.19	5.800	34.99	8.867	2.55	11.93	1.46
2.767	2.19	5.833	34.99	8.900	2.55	11.97	1.46
2.800	2.19	5.867	34.99	8.933	2.55	12.00	1.46
2.833	2.19	5.900	34.99	8.967	2.55	12.03	1.46
2.867	2.19	5.933	34.99	9.000	2.55	12.07	1.46
2.900	2.19	5.967	34.99	9.033	2.55	12.10	1.46
2.933	2.19	6.000	34.99	9.067	2.55	12.13	1.46
2.967	2.19	6.033	96.21	9.100	2.55	12.17	1.46
3.000	2.19	6.067	96.21	9.133	2.55	12.20	1.46
3.033	2.19	6.100	96.21	9.167	2.55	12.23	1.46
3.067	2.19	6.133	96.21	9.200	2.55	12.27	0.73

Max.Eff.Inten.(mm/hr)=	96.21	29.08	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.66 (ii)	6.57 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.44	0.16	
			TOTALS
PEAK FLOW (cms)=	0.07	0.01	0.071 (iii)
TIME TO PEAK (hrs)=	6.23	6.30	6.23
RUNOFF VOLUME (mm)=	70.89	18.30	56.15
TOTAL RAINFALL (mm)=	72.89	72.89	72.89
RUNOFF COEFFICIENT =	0.97	0.25	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0150):	0.31	0.052	6.23	46.68
	+ ID2= 2 (0160):	0.34	0.071	6.23	56.15

ID = 3 (0162): 0.65 0.124 6.23 51.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.122	6.23	45.12
+ ID2= 2 (0162):	0.65	0.124	6.23	51.64
ID = 3 (0167):	1.47	0.245	6.23	48.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0140) | ID= 1 DT= 2.0 min	Area (ha)= 0.11	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.19	6.167	96.21	9.23	2.55
0.067	0.00	3.133	2.19	6.200	96.21	9.27	2.55
0.100	0.00	3.167	2.19	6.233	96.21	9.30	2.55
0.133	0.00	3.200	2.19	6.267	54.68	9.33	2.55
0.167	0.00	3.233	2.19	6.300	13.12	9.37	2.55
0.200	0.00	3.267	2.55	6.333	13.12	9.40	2.55
0.233	0.00	3.300	2.92	6.367	13.12	9.43	2.55
0.267	0.91	3.333	2.92	6.400	13.12	9.47	2.55
0.300	1.82	3.367	2.92	6.433	13.12	9.50	2.55
0.333	1.82	3.400	2.92	6.467	13.12	9.53	2.55
0.367	1.82	3.433	2.92	6.500	13.12	9.57	2.55
0.400	1.82	3.467	2.92	6.533	13.12	9.60	2.55
0.433	1.82	3.500	2.92	6.567	13.12	9.63	2.55
0.467	1.82	3.533	2.92	6.600	13.12	9.67	2.55
0.500	1.82	3.567	2.92	6.633	13.12	9.70	2.55

0.533	1.82	3.600	2.92	6.667	13.12	9.73	2.55
0.567	1.82	3.633	2.92	6.700	13.12	9.77	2.55
0.600	1.82	3.667	2.92	6.733	13.12	9.80	2.55
0.633	1.82	3.700	2.92	6.767	9.48	9.83	2.55
0.667	1.82	3.733	2.92	6.800	5.83	9.87	2.55
0.700	1.82	3.767	2.92	6.833	5.83	9.90	2.55
0.733	1.82	3.800	2.92	6.867	5.83	9.93	2.55
0.767	1.82	3.833	2.92	6.900	5.83	9.97	2.55
0.800	1.82	3.867	2.92	6.933	5.83	10.00	2.55
0.833	1.82	3.900	2.92	6.967	5.83	10.03	2.55
0.867	1.82	3.933	2.92	7.000	5.83	10.07	2.55
0.900	1.82	3.967	2.92	7.033	5.83	10.10	2.55
0.933	1.82	4.000	2.92	7.067	5.83	10.13	2.55
0.967	1.82	4.033	2.92	7.100	5.83	10.17	2.55
1.000	1.82	4.067	2.92	7.133	5.83	10.20	2.55
1.033	1.82	4.100	2.92	7.167	5.83	10.23	2.55
1.067	1.82	4.133	2.92	7.200	5.83	10.27	2.00
1.100	1.82	4.167	2.92	7.233	5.83	10.30	1.46
1.133	1.82	4.200	2.92	7.267	5.10	10.33	1.46
1.167	1.82	4.233	2.92	7.300	4.37	10.37	1.46
1.200	1.82	4.267	3.64	7.333	4.37	10.40	1.46
1.233	1.82	4.300	4.37	7.367	4.37	10.43	1.46
1.267	1.82	4.333	4.37	7.400	4.37	10.47	1.46
1.300	1.82	4.367	4.37	7.433	4.37	10.50	1.46
1.333	1.82	4.400	4.37	7.467	4.37	10.53	1.46
1.367	1.82	4.433	4.37	7.500	4.37	10.57	1.46
1.400	1.82	4.467	4.37	7.533	4.37	10.60	1.46
1.433	1.82	4.500	4.37	7.567	4.37	10.63	1.46
1.467	1.82	4.533	4.37	7.600	4.37	10.67	1.46
1.500	1.82	4.567	4.37	7.633	4.37	10.70	1.46
1.533	1.82	4.600	4.37	7.667	4.37	10.73	1.46
1.567	1.82	4.633	4.37	7.700	4.37	10.77	1.46
1.600	1.82	4.667	4.37	7.733	4.37	10.80	1.46
1.633	1.82	4.700	4.37	7.767	4.37	10.83	1.46
1.667	1.82	4.733	4.37	7.800	4.37	10.87	1.46
1.700	1.82	4.767	5.10	7.833	4.37	10.90	1.46
1.733	1.82	4.800	5.83	7.867	4.37	10.93	1.46
1.767	1.82	4.833	5.83	7.900	4.37	10.97	1.46
1.800	1.82	4.867	5.83	7.933	4.37	11.00	1.46
1.833	1.82	4.900	5.83	7.967	4.37	11.03	1.46
1.867	1.82	4.933	5.83	8.000	4.37	11.07	1.46
1.900	1.82	4.967	5.83	8.033	4.37	11.10	1.46
1.933	1.82	5.000	5.83	8.067	4.37	11.13	1.46
1.967	1.82	5.033	5.83	8.100	4.37	11.17	1.46
2.000	1.82	5.067	5.83	8.133	4.37	11.20	1.46
2.033	1.82	5.100	5.83	8.167	4.37	11.23	1.46
2.067	1.82	5.133	5.83	8.200	4.37	11.27	1.46
2.100	1.82	5.167	5.83	8.233	4.37	11.30	1.46
2.133	1.82	5.200	5.83	8.267	3.46	11.33	1.46

2.167	1.82	5.233	5.83	8.300	2.55	11.37	1.46
2.200	1.82	5.267	7.29	8.333	2.55	11.40	1.46
2.233	1.82	5.300	8.75	8.367	2.55	11.43	1.46
2.267	2.00	5.333	8.75	8.400	2.55	11.47	1.46
2.300	2.19	5.367	8.75	8.433	2.55	11.50	1.46
2.333	2.19	5.400	8.75	8.467	2.55	11.53	1.46
2.367	2.19	5.433	8.75	8.500	2.55	11.57	1.46
2.400	2.19	5.467	8.75	8.533	2.55	11.60	1.46
2.433	2.19	5.500	8.75	8.567	2.55	11.63	1.46
2.467	2.19	5.533	8.75	8.600	2.55	11.67	1.46
2.500	2.19	5.567	8.75	8.633	2.55	11.70	1.46
2.533	2.19	5.600	8.75	8.667	2.55	11.73	1.46
2.567	2.19	5.633	8.75	8.700	2.55	11.77	1.46
2.600	2.19	5.667	8.75	8.733	2.55	11.80	1.46
2.633	2.19	5.700	8.75	8.767	2.55	11.83	1.46
2.667	2.19	5.733	8.75	8.800	2.55	11.87	1.46
2.700	2.19	5.767	21.86	8.833	2.55	11.90	1.46
2.733	2.19	5.800	34.99	8.867	2.55	11.93	1.46
2.767	2.19	5.833	34.99	8.900	2.55	11.97	1.46
2.800	2.19	5.867	34.99	8.933	2.55	12.00	1.46
2.833	2.19	5.900	34.99	8.967	2.55	12.03	1.46
2.867	2.19	5.933	34.99	9.000	2.55	12.07	1.46
2.900	2.19	5.967	34.99	9.033	2.55	12.10	1.46
2.933	2.19	6.000	34.99	9.067	2.55	12.13	1.46
2.967	2.19	6.033	96.21	9.100	2.55	12.17	1.46
3.000	2.19	6.067	96.21	9.133	2.55	12.20	1.46
3.033	2.19	6.100	96.21	9.167	2.55	12.23	1.46
3.067	2.19	6.133	96.21	9.200	2.55	12.27	0.73

				TOTALS
Max.Eff.Inten.(mm/hr)=		96.21	29.08	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.18 (ii)	5.70 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.49	0.19	
PEAK FLOW	(cms)=	0.02	0.00	0.024 (iii)
TIME TO PEAK	(hrs)=	6.23	6.27	6.23
RUNOFF VOLUME	(mm)=	70.89	18.30	58.25
TOTAL RAINFALL	(mm)=	72.89	72.89	72.89
RUNOFF COEFFICIENT	=	0.97	0.25	0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\dd5ff3e6-cd84-4d1d-bfb3-4ccaa63008c3\sc

Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\dd5ff3e6-cd84-4d1d-bfb3-4ccaa63008c3\sc

DATE: 01-16-2026 TIME: 04:29:25

USER:

COMMENTS: _____

****
** SIMULATION : 12hr SCS 2yr **
****

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\91c84e44-e32d-4dda-9fa8-0b4aecedc8e1\7bce1e5a
Ptotal= 45.77 mm	Comments: 12hr SCS 2yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	1.83	6.50	8.24	9.75	1.60
0.25	1.14	3.50	1.83	6.75	3.66	10.00	1.60
0.50	1.14	3.75	1.83	7.00	3.66	10.25	0.92
0.75	1.14	4.00	1.83	7.25	2.75	10.50	0.92
1.00	1.14	4.25	2.75	7.50	2.75	10.75	0.92
1.25	1.14	4.50	2.75	7.75	2.75	11.00	0.92
1.50	1.14	4.75	3.66	8.00	2.75	11.25	0.92
1.75	1.14	5.00	3.66	8.25	1.60	11.50	0.92
2.00	1.14	5.25	5.49	8.50	1.60	11.75	0.92
2.25	1.37	5.50	5.49	8.75	1.60	12.00	0.92
2.50	1.37	5.75	21.97	9.00	1.60		
2.75	1.37	6.00	60.42	9.25	1.60		
3.00	1.37	6.25	8.24	9.50	1.60		

CALIB	
STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.37	6.167	60.42	9.23	1.60
0.067	0.00	3.133	1.37	6.200	60.42	9.27	1.60
0.100	0.00	3.167	1.37	6.233	60.42	9.30	1.60
0.133	0.00	3.200	1.37	6.267	34.33	9.33	1.60
0.167	0.00	3.233	1.37	6.300	8.24	9.37	1.60
0.200	0.00	3.267	1.60	6.333	8.24	9.40	1.60
0.233	0.00	3.300	1.83	6.367	8.24	9.43	1.60
0.267	0.57	3.333	1.83	6.400	8.24	9.47	1.60

0.300	1.14	3.367	1.83	6.433	8.24	9.50	1.60
0.333	1.14	3.400	1.83	6.467	8.24	9.53	1.60
0.367	1.14	3.433	1.83	6.500	8.24	9.57	1.60
0.400	1.14	3.467	1.83	6.533	8.24	9.60	1.60
0.433	1.14	3.500	1.83	6.567	8.24	9.63	1.60
0.467	1.14	3.533	1.83	6.600	8.24	9.67	1.60
0.500	1.14	3.567	1.83	6.633	8.24	9.70	1.60
0.533	1.14	3.600	1.83	6.667	8.24	9.73	1.60
0.567	1.14	3.633	1.83	6.700	8.24	9.77	1.60
0.600	1.14	3.667	1.83	6.733	8.24	9.80	1.60
0.633	1.14	3.700	1.83	6.767	5.95	9.83	1.60
0.667	1.14	3.733	1.83	6.800	3.66	9.87	1.60
0.700	1.14	3.767	1.83	6.833	3.66	9.90	1.60
0.733	1.14	3.800	1.83	6.867	3.66	9.93	1.60
0.767	1.14	3.833	1.83	6.900	3.66	9.97	1.60
0.800	1.14	3.867	1.83	6.933	3.66	10.00	1.60
0.833	1.14	3.900	1.83	6.967	3.66	10.03	1.60
0.867	1.14	3.933	1.83	7.000	3.66	10.07	1.60
0.900	1.14	3.967	1.83	7.033	3.66	10.10	1.60
0.933	1.14	4.000	1.83	7.067	3.66	10.13	1.60
0.967	1.14	4.033	1.83	7.100	3.66	10.17	1.60
1.000	1.14	4.067	1.83	7.133	3.66	10.20	1.60
1.033	1.14	4.100	1.83	7.167	3.66	10.23	1.60
1.067	1.14	4.133	1.83	7.200	3.66	10.27	1.26
1.100	1.14	4.167	1.83	7.233	3.66	10.30	0.92
1.133	1.14	4.200	1.83	7.267	3.20	10.33	0.92
1.167	1.14	4.233	1.83	7.300	2.75	10.37	0.92
1.200	1.14	4.267	2.29	7.333	2.75	10.40	0.92
1.233	1.14	4.300	2.75	7.367	2.75	10.43	0.92
1.267	1.14	4.333	2.75	7.400	2.75	10.47	0.92
1.300	1.14	4.367	2.75	7.433	2.75	10.50	0.92
1.333	1.14	4.400	2.75	7.467	2.75	10.53	0.92
1.367	1.14	4.433	2.75	7.500	2.75	10.57	0.92
1.400	1.14	4.467	2.75	7.533	2.75	10.60	0.92
1.433	1.14	4.500	2.75	7.567	2.75	10.63	0.92
1.467	1.14	4.533	2.75	7.600	2.75	10.67	0.92
1.500	1.14	4.567	2.75	7.633	2.75	10.70	0.92
1.533	1.14	4.600	2.75	7.667	2.75	10.73	0.92
1.567	1.14	4.633	2.75	7.700	2.75	10.77	0.92
1.600	1.14	4.667	2.75	7.733	2.75	10.80	0.92
1.633	1.14	4.700	2.75	7.767	2.75	10.83	0.92
1.667	1.14	4.733	2.75	7.800	2.75	10.87	0.92
1.700	1.14	4.767	3.20	7.833	2.75	10.90	0.92
1.733	1.14	4.800	3.66	7.867	2.75	10.93	0.92
1.767	1.14	4.833	3.66	7.900	2.75	10.97	0.92
1.800	1.14	4.867	3.66	7.933	2.75	11.00	0.92
1.833	1.14	4.900	3.66	7.967	2.75	11.03	0.92
1.867	1.14	4.933	3.66	8.000	2.75	11.07	0.92
1.900	1.14	4.967	3.66	8.033	2.75	11.10	0.92

1.933	1.14	5.000	3.66	8.067	2.75	11.13	0.92
1.967	1.14	5.033	3.66	8.100	2.75	11.17	0.92
2.000	1.14	5.067	3.66	8.133	2.75	11.20	0.92
2.033	1.14	5.100	3.66	8.167	2.75	11.23	0.92
2.067	1.14	5.133	3.66	8.200	2.75	11.27	0.92
2.100	1.14	5.167	3.66	8.233	2.75	11.30	0.92
2.133	1.14	5.200	3.66	8.267	2.17	11.33	0.92
2.167	1.14	5.233	3.66	8.300	1.60	11.37	0.92
2.200	1.14	5.267	4.58	8.333	1.60	11.40	0.92
2.233	1.14	5.300	5.49	8.367	1.60	11.43	0.92
2.267	1.26	5.333	5.49	8.400	1.60	11.47	0.92
2.300	1.37	5.367	5.49	8.433	1.60	11.50	0.92
2.333	1.37	5.400	5.49	8.467	1.60	11.53	0.92
2.367	1.37	5.433	5.49	8.500	1.60	11.57	0.92
2.400	1.37	5.467	5.49	8.533	1.60	11.60	0.92
2.433	1.37	5.500	5.49	8.567	1.60	11.63	0.92
2.467	1.37	5.533	5.49	8.600	1.60	11.67	0.92
2.500	1.37	5.567	5.49	8.633	1.60	11.70	0.92
2.533	1.37	5.600	5.49	8.667	1.60	11.73	0.92
2.567	1.37	5.633	5.49	8.700	1.60	11.77	0.92
2.600	1.37	5.667	5.49	8.733	1.60	11.80	0.92
2.633	1.37	5.700	5.49	8.767	1.60	11.83	0.92
2.667	1.37	5.733	5.49	8.800	1.60	11.87	0.92
2.700	1.37	5.767	13.73	8.833	1.60	11.90	0.92
2.733	1.37	5.800	21.97	8.867	1.60	11.93	0.92
2.767	1.37	5.833	21.97	8.900	1.60	11.97	0.92
2.800	1.37	5.867	21.97	8.933	1.60	12.00	0.92
2.833	1.37	5.900	21.97	8.967	1.60	12.03	0.92
2.867	1.37	5.933	21.97	9.000	1.60	12.07	0.92
2.900	1.37	5.967	21.97	9.033	1.60	12.10	0.92
2.933	1.37	6.000	21.97	9.067	1.60	12.13	0.92
2.967	1.37	6.033	60.41	9.100	1.60	12.17	0.92
3.000	1.37	6.067	60.42	9.133	1.60	12.20	0.92
3.033	1.37	6.100	60.42	9.167	1.60	12.23	0.92
3.067	1.37	6.133	60.42	9.200	1.60	12.27	0.46

Max.Eff.Inten.(mm/hr)=		60.42	18.56	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.43 (ii)	6.75 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.47	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.015 (iii)
TIME TO PEAK	(hrs)=	6.23	6.30	6.23
RUNOFF VOLUME	(mm)=	43.77	11.50	36.33
TOTAL RAINFALL	(mm)=	45.77	45.77	45.77
RUNOFF COEFFICIENT	=	0.96	0.25	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.37	6.167	60.42	9.23	1.60
0.067	0.00	3.133	1.37	6.200	60.42	9.27	1.60
0.100	0.00	3.167	1.37	6.233	60.42	9.30	1.60
0.133	0.00	3.200	1.37	6.267	34.33	9.33	1.60
0.167	0.00	3.233	1.37	6.300	8.24	9.37	1.60
0.200	0.00	3.267	1.60	6.333	8.24	9.40	1.60
0.233	0.00	3.300	1.83	6.367	8.24	9.43	1.60
0.267	0.57	3.333	1.83	6.400	8.24	9.47	1.60
0.300	1.14	3.367	1.83	6.433	8.24	9.50	1.60
0.333	1.14	3.400	1.83	6.467	8.24	9.53	1.60
0.367	1.14	3.433	1.83	6.500	8.24	9.57	1.60
0.400	1.14	3.467	1.83	6.533	8.24	9.60	1.60
0.433	1.14	3.500	1.83	6.567	8.24	9.63	1.60
0.467	1.14	3.533	1.83	6.600	8.24	9.67	1.60
0.500	1.14	3.567	1.83	6.633	8.24	9.70	1.60
0.533	1.14	3.600	1.83	6.667	8.24	9.73	1.60
0.567	1.14	3.633	1.83	6.700	8.24	9.77	1.60
0.600	1.14	3.667	1.83	6.733	8.24	9.80	1.60
0.633	1.14	3.700	1.83	6.767	5.95	9.83	1.60
0.667	1.14	3.733	1.83	6.800	3.66	9.87	1.60
0.700	1.14	3.767	1.83	6.833	3.66	9.90	1.60
0.733	1.14	3.800	1.83	6.867	3.66	9.93	1.60
0.767	1.14	3.833	1.83	6.900	3.66	9.97	1.60

0.800	1.14	3.867	1.83	6.933	3.66	10.00	1.60
0.833	1.14	3.900	1.83	6.967	3.66	10.03	1.60
0.867	1.14	3.933	1.83	7.000	3.66	10.07	1.60
0.900	1.14	3.967	1.83	7.033	3.66	10.10	1.60
0.933	1.14	4.000	1.83	7.067	3.66	10.13	1.60
0.967	1.14	4.033	1.83	7.100	3.66	10.17	1.60
1.000	1.14	4.067	1.83	7.133	3.66	10.20	1.60
1.033	1.14	4.100	1.83	7.167	3.66	10.23	1.60
1.067	1.14	4.133	1.83	7.200	3.66	10.27	1.26
1.100	1.14	4.167	1.83	7.233	3.66	10.30	0.92
1.133	1.14	4.200	1.83	7.267	3.20	10.33	0.92
1.167	1.14	4.233	1.83	7.300	2.75	10.37	0.92
1.200	1.14	4.267	2.29	7.333	2.75	10.40	0.92
1.233	1.14	4.300	2.75	7.367	2.75	10.43	0.92
1.267	1.14	4.333	2.75	7.400	2.75	10.47	0.92
1.300	1.14	4.367	2.75	7.433	2.75	10.50	0.92
1.333	1.14	4.400	2.75	7.467	2.75	10.53	0.92
1.367	1.14	4.433	2.75	7.500	2.75	10.57	0.92
1.400	1.14	4.467	2.75	7.533	2.75	10.60	0.92
1.433	1.14	4.500	2.75	7.567	2.75	10.63	0.92
1.467	1.14	4.533	2.75	7.600	2.75	10.67	0.92
1.500	1.14	4.567	2.75	7.633	2.75	10.70	0.92
1.533	1.14	4.600	2.75	7.667	2.75	10.73	0.92
1.567	1.14	4.633	2.75	7.700	2.75	10.77	0.92
1.600	1.14	4.667	2.75	7.733	2.75	10.80	0.92
1.633	1.14	4.700	2.75	7.767	2.75	10.83	0.92
1.667	1.14	4.733	2.75	7.800	2.75	10.87	0.92
1.700	1.14	4.767	3.20	7.833	2.75	10.90	0.92
1.733	1.14	4.800	3.66	7.867	2.75	10.93	0.92
1.767	1.14	4.833	3.66	7.900	2.75	10.97	0.92
1.800	1.14	4.867	3.66	7.933	2.75	11.00	0.92
1.833	1.14	4.900	3.66	7.967	2.75	11.03	0.92
1.867	1.14	4.933	3.66	8.000	2.75	11.07	0.92
1.900	1.14	4.967	3.66	8.033	2.75	11.10	0.92
1.933	1.14	5.000	3.66	8.067	2.75	11.13	0.92
1.967	1.14	5.033	3.66	8.100	2.75	11.17	0.92
2.000	1.14	5.067	3.66	8.133	2.75	11.20	0.92
2.033	1.14	5.100	3.66	8.167	2.75	11.23	0.92
2.067	1.14	5.133	3.66	8.200	2.75	11.27	0.92
2.100	1.14	5.167	3.66	8.233	2.75	11.30	0.92
2.133	1.14	5.200	3.66	8.267	2.17	11.33	0.92
2.167	1.14	5.233	3.66	8.300	1.60	11.37	0.92
2.200	1.14	5.267	4.58	8.333	1.60	11.40	0.92
2.233	1.14	5.300	5.49	8.367	1.60	11.43	0.92
2.267	1.26	5.333	5.49	8.400	1.60	11.47	0.92
2.300	1.37	5.367	5.49	8.433	1.60	11.50	0.92
2.333	1.37	5.400	5.49	8.467	1.60	11.53	0.92
2.367	1.37	5.433	5.49	8.500	1.60	11.57	0.92
2.400	1.37	5.467	5.49	8.533	1.60	11.60	0.92

2.433	1.37	5.500	5.49	8.567	1.60	11.63	0.92
2.467	1.37	5.533	5.49	8.600	1.60	11.67	0.92
2.500	1.37	5.567	5.49	8.633	1.60	11.70	0.92
2.533	1.37	5.600	5.49	8.667	1.60	11.73	0.92
2.567	1.37	5.633	5.49	8.700	1.60	11.77	0.92
2.600	1.37	5.667	5.49	8.733	1.60	11.80	0.92
2.633	1.37	5.700	5.49	8.767	1.60	11.83	0.92
2.667	1.37	5.733	5.49	8.800	1.60	11.87	0.92
2.700	1.37	5.767	13.73	8.833	1.60	11.90	0.92
2.733	1.37	5.800	21.97	8.867	1.60	11.93	0.92
2.767	1.37	5.833	21.97	8.900	1.60	11.97	0.92
2.800	1.37	5.867	21.97	8.933	1.60	12.00	0.92
2.833	1.37	5.900	21.97	8.967	1.60	12.03	0.92
2.867	1.37	5.933	21.97	9.000	1.60	12.07	0.92
2.900	1.37	5.967	21.97	9.033	1.60	12.10	0.92
2.933	1.37	6.000	21.97	9.067	1.60	12.13	0.92
2.967	1.37	6.033	60.41	9.100	1.60	12.17	0.92
3.000	1.37	6.067	60.42	9.133	1.60	12.20	0.92
3.033	1.37	6.100	60.42	9.167	1.60	12.23	0.92
3.067	1.37	6.133	60.42	9.200	1.60	12.27	0.46

Max.Eff.Inten.(mm/hr)=		60.42	16.54
over (min)		5.00	18.00
Storage Coeff. (min)=		2.50 (ii)	16.99 (ii)
Unit Hyd. Tpeak (min)=		4.00	18.00
Unit Hyd. peak (cms)=		0.37	0.07
			TOTALS
PEAK FLOW	(cms)=	0.04	0.01	0.050 (iii)
TIME TO PEAK	(hrs)=	6.23	6.43	6.23
RUNOFF VOLUME	(mm)=	43.77	11.50	23.10
TOTAL RAINFALL	(mm)=	45.77	45.77	45.77
RUNOFF COEFFICIENT	=	0.96	0.25	0.50

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0110):	0.71	0.050	6.23	23.10
	+ ID2= 2 (0120):	0.11	0.015	6.23	36.33
		==========			

ID = 3 (0122): 0.82 0.065 6.23 24.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)=	0.31	
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.37	6.167	60.42	9.23	1.60
0.067	0.00	3.133	1.37	6.200	60.42	9.27	1.60
0.100	0.00	3.167	1.37	6.233	60.42	9.30	1.60
0.133	0.00	3.200	1.37	6.267	34.33	9.33	1.60
0.167	0.00	3.233	1.37	6.300	8.24	9.37	1.60
0.200	0.00	3.267	1.60	6.333	8.24	9.40	1.60
0.233	0.00	3.300	1.83	6.367	8.24	9.43	1.60
0.267	0.57	3.333	1.83	6.400	8.24	9.47	1.60
0.300	1.14	3.367	1.83	6.433	8.24	9.50	1.60
0.333	1.14	3.400	1.83	6.467	8.24	9.53	1.60
0.367	1.14	3.433	1.83	6.500	8.24	9.57	1.60
0.400	1.14	3.467	1.83	6.533	8.24	9.60	1.60
0.433	1.14	3.500	1.83	6.567	8.24	9.63	1.60
0.467	1.14	3.533	1.83	6.600	8.24	9.67	1.60
0.500	1.14	3.567	1.83	6.633	8.24	9.70	1.60
0.533	1.14	3.600	1.83	6.667	8.24	9.73	1.60
0.567	1.14	3.633	1.83	6.700	8.24	9.77	1.60
0.600	1.14	3.667	1.83	6.733	8.24	9.80	1.60
0.633	1.14	3.700	1.83	6.767	5.95	9.83	1.60
0.667	1.14	3.733	1.83	6.800	3.66	9.87	1.60
0.700	1.14	3.767	1.83	6.833	3.66	9.90	1.60
0.733	1.14	3.800	1.83	6.867	3.66	9.93	1.60
0.767	1.14	3.833	1.83	6.900	3.66	9.97	1.60
0.800	1.14	3.867	1.83	6.933	3.66	10.00	1.60
0.833	1.14	3.900	1.83	6.967	3.66	10.03	1.60
0.867	1.14	3.933	1.83	7.000	3.66	10.07	1.60
0.900	1.14	3.967	1.83	7.033	3.66	10.10	1.60

0.933	1.14	4.000	1.83	7.067	3.66	10.13	1.60
0.967	1.14	4.033	1.83	7.100	3.66	10.17	1.60
1.000	1.14	4.067	1.83	7.133	3.66	10.20	1.60
1.033	1.14	4.100	1.83	7.167	3.66	10.23	1.60
1.067	1.14	4.133	1.83	7.200	3.66	10.27	1.26
1.100	1.14	4.167	1.83	7.233	3.66	10.30	0.92
1.133	1.14	4.200	1.83	7.267	3.20	10.33	0.92
1.167	1.14	4.233	1.83	7.300	2.75	10.37	0.92
1.200	1.14	4.267	2.29	7.333	2.75	10.40	0.92
1.233	1.14	4.300	2.75	7.367	2.75	10.43	0.92
1.267	1.14	4.333	2.75	7.400	2.75	10.47	0.92
1.300	1.14	4.367	2.75	7.433	2.75	10.50	0.92
1.333	1.14	4.400	2.75	7.467	2.75	10.53	0.92
1.367	1.14	4.433	2.75	7.500	2.75	10.57	0.92
1.400	1.14	4.467	2.75	7.533	2.75	10.60	0.92
1.433	1.14	4.500	2.75	7.567	2.75	10.63	0.92
1.467	1.14	4.533	2.75	7.600	2.75	10.67	0.92
1.500	1.14	4.567	2.75	7.633	2.75	10.70	0.92
1.533	1.14	4.600	2.75	7.667	2.75	10.73	0.92
1.567	1.14	4.633	2.75	7.700	2.75	10.77	0.92
1.600	1.14	4.667	2.75	7.733	2.75	10.80	0.92
1.633	1.14	4.700	2.75	7.767	2.75	10.83	0.92
1.667	1.14	4.733	2.75	7.800	2.75	10.87	0.92
1.700	1.14	4.767	3.20	7.833	2.75	10.90	0.92
1.733	1.14	4.800	3.66	7.867	2.75	10.93	0.92
1.767	1.14	4.833	3.66	7.900	2.75	10.97	0.92
1.800	1.14	4.867	3.66	7.933	2.75	11.00	0.92
1.833	1.14	4.900	3.66	7.967	2.75	11.03	0.92
1.867	1.14	4.933	3.66	8.000	2.75	11.07	0.92
1.900	1.14	4.967	3.66	8.033	2.75	11.10	0.92
1.933	1.14	5.000	3.66	8.067	2.75	11.13	0.92
1.967	1.14	5.033	3.66	8.100	2.75	11.17	0.92
2.000	1.14	5.067	3.66	8.133	2.75	11.20	0.92
2.033	1.14	5.100	3.66	8.167	2.75	11.23	0.92
2.067	1.14	5.133	3.66	8.200	2.75	11.27	0.92
2.100	1.14	5.167	3.66	8.233	2.75	11.30	0.92
2.133	1.14	5.200	3.66	8.267	2.17	11.33	0.92
2.167	1.14	5.233	3.66	8.300	1.60	11.37	0.92
2.200	1.14	5.267	4.58	8.333	1.60	11.40	0.92
2.233	1.14	5.300	5.49	8.367	1.60	11.43	0.92
2.267	1.26	5.333	5.49	8.400	1.60	11.47	0.92
2.300	1.37	5.367	5.49	8.433	1.60	11.50	0.92
2.333	1.37	5.400	5.49	8.467	1.60	11.53	0.92
2.367	1.37	5.433	5.49	8.500	1.60	11.57	0.92
2.400	1.37	5.467	5.49	8.533	1.60	11.60	0.92
2.433	1.37	5.500	5.49	8.567	1.60	11.63	0.92
2.467	1.37	5.533	5.49	8.600	1.60	11.67	0.92
2.500	1.37	5.567	5.49	8.633	1.60	11.70	0.92
2.533	1.37	5.600	5.49	8.667	1.60	11.73	0.92

2.567	1.37	5.633	5.49	8.700	1.60	11.77	0.92
2.600	1.37	5.667	5.49	8.733	1.60	11.80	0.92
2.633	1.37	5.700	5.49	8.767	1.60	11.83	0.92
2.667	1.37	5.733	5.49	8.800	1.60	11.87	0.92
2.700	1.37	5.767	13.73	8.833	1.60	11.90	0.92
2.733	1.37	5.800	21.97	8.867	1.60	11.93	0.92
2.767	1.37	5.833	21.97	8.900	1.60	11.97	0.92
2.800	1.37	5.867	21.97	8.933	1.60	12.00	0.92
2.833	1.37	5.900	21.97	8.967	1.60	12.03	0.92
2.867	1.37	5.933	21.97	9.000	1.60	12.07	0.92
2.900	1.37	5.967	21.97	9.033	1.60	12.10	0.92
2.933	1.37	6.000	21.97	9.067	1.60	12.13	0.92
2.967	1.37	6.033	60.41	9.100	1.60	12.17	0.92
3.000	1.37	6.067	60.42	9.133	1.60	12.20	0.92
3.033	1.37	6.100	60.42	9.167	1.60	12.23	0.92
3.067	1.37	6.133	60.42	9.200	1.60	12.27	0.46

Max.Eff.Inten.(mm/hr)=		60.42	8.80	
over (min)		5.00	22.00	
Storage Coeff. (min)=		1.95 (ii)	20.60 (ii)	
Unit Hyd. Tpeak (min)=		4.00	22.00	
Unit Hyd. peak (cms)=		0.41	0.05	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK	(hrs)=	6.23	6.53	6.23
RUNOFF VOLUME	(mm)=	43.77	7.40	27.00
TOTAL RAINFALL	(mm)=	45.77	45.77	45.77
RUNOFF COEFFICIENT	=	0.96	0.16	0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area	(ha)=	0.34
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.37	6.167	60.42	9.23	1.60
0.067	0.00	3.133	1.37	6.200	60.42	9.27	1.60
0.100	0.00	3.167	1.37	6.233	60.42	9.30	1.60
0.133	0.00	3.200	1.37	6.267	34.33	9.33	1.60
0.167	0.00	3.233	1.37	6.300	8.24	9.37	1.60
0.200	0.00	3.267	1.60	6.333	8.24	9.40	1.60
0.233	0.00	3.300	1.83	6.367	8.24	9.43	1.60
0.267	0.57	3.333	1.83	6.400	8.24	9.47	1.60
0.300	1.14	3.367	1.83	6.433	8.24	9.50	1.60
0.333	1.14	3.400	1.83	6.467	8.24	9.53	1.60
0.367	1.14	3.433	1.83	6.500	8.24	9.57	1.60
0.400	1.14	3.467	1.83	6.533	8.24	9.60	1.60
0.433	1.14	3.500	1.83	6.567	8.24	9.63	1.60
0.467	1.14	3.533	1.83	6.600	8.24	9.67	1.60
0.500	1.14	3.567	1.83	6.633	8.24	9.70	1.60
0.533	1.14	3.600	1.83	6.667	8.24	9.73	1.60
0.567	1.14	3.633	1.83	6.700	8.24	9.77	1.60
0.600	1.14	3.667	1.83	6.733	8.24	9.80	1.60
0.633	1.14	3.700	1.83	6.767	5.95	9.83	1.60
0.667	1.14	3.733	1.83	6.800	3.66	9.87	1.60
0.700	1.14	3.767	1.83	6.833	3.66	9.90	1.60
0.733	1.14	3.800	1.83	6.867	3.66	9.93	1.60
0.767	1.14	3.833	1.83	6.900	3.66	9.97	1.60
0.800	1.14	3.867	1.83	6.933	3.66	10.00	1.60
0.833	1.14	3.900	1.83	6.967	3.66	10.03	1.60
0.867	1.14	3.933	1.83	7.000	3.66	10.07	1.60
0.900	1.14	3.967	1.83	7.033	3.66	10.10	1.60
0.933	1.14	4.000	1.83	7.067	3.66	10.13	1.60
0.967	1.14	4.033	1.83	7.100	3.66	10.17	1.60
1.000	1.14	4.067	1.83	7.133	3.66	10.20	1.60
1.033	1.14	4.100	1.83	7.167	3.66	10.23	1.60
1.067	1.14	4.133	1.83	7.200	3.66	10.27	1.26
1.100	1.14	4.167	1.83	7.233	3.66	10.30	0.92
1.133	1.14	4.200	1.83	7.267	3.20	10.33	0.92
1.167	1.14	4.233	1.83	7.300	2.75	10.37	0.92
1.200	1.14	4.267	2.29	7.333	2.75	10.40	0.92
1.233	1.14	4.300	2.75	7.367	2.75	10.43	0.92
1.267	1.14	4.333	2.75	7.400	2.75	10.47	0.92
1.300	1.14	4.367	2.75	7.433	2.75	10.50	0.92
1.333	1.14	4.400	2.75	7.467	2.75	10.53	0.92
1.367	1.14	4.433	2.75	7.500	2.75	10.57	0.92
1.400	1.14	4.467	2.75	7.533	2.75	10.60	0.92

1.433	1.14	4.500	2.75	7.567	2.75	10.63	0.92
1.467	1.14	4.533	2.75	7.600	2.75	10.67	0.92
1.500	1.14	4.567	2.75	7.633	2.75	10.70	0.92
1.533	1.14	4.600	2.75	7.667	2.75	10.73	0.92
1.567	1.14	4.633	2.75	7.700	2.75	10.77	0.92
1.600	1.14	4.667	2.75	7.733	2.75	10.80	0.92
1.633	1.14	4.700	2.75	7.767	2.75	10.83	0.92
1.667	1.14	4.733	2.75	7.800	2.75	10.87	0.92
1.700	1.14	4.767	3.20	7.833	2.75	10.90	0.92
1.733	1.14	4.800	3.66	7.867	2.75	10.93	0.92
1.767	1.14	4.833	3.66	7.900	2.75	10.97	0.92
1.800	1.14	4.867	3.66	7.933	2.75	11.00	0.92
1.833	1.14	4.900	3.66	7.967	2.75	11.03	0.92
1.867	1.14	4.933	3.66	8.000	2.75	11.07	0.92
1.900	1.14	4.967	3.66	8.033	2.75	11.10	0.92
1.933	1.14	5.000	3.66	8.067	2.75	11.13	0.92
1.967	1.14	5.033	3.66	8.100	2.75	11.17	0.92
2.000	1.14	5.067	3.66	8.133	2.75	11.20	0.92
2.033	1.14	5.100	3.66	8.167	2.75	11.23	0.92
2.067	1.14	5.133	3.66	8.200	2.75	11.27	0.92
2.100	1.14	5.167	3.66	8.233	2.75	11.30	0.92
2.133	1.14	5.200	3.66	8.267	2.17	11.33	0.92
2.167	1.14	5.233	3.66	8.300	1.60	11.37	0.92
2.200	1.14	5.267	4.58	8.333	1.60	11.40	0.92
2.233	1.14	5.300	5.49	8.367	1.60	11.43	0.92
2.267	1.26	5.333	5.49	8.400	1.60	11.47	0.92
2.300	1.37	5.367	5.49	8.433	1.60	11.50	0.92
2.333	1.37	5.400	5.49	8.467	1.60	11.53	0.92
2.367	1.37	5.433	5.49	8.500	1.60	11.57	0.92
2.400	1.37	5.467	5.49	8.533	1.60	11.60	0.92
2.433	1.37	5.500	5.49	8.567	1.60	11.63	0.92
2.467	1.37	5.533	5.49	8.600	1.60	11.67	0.92
2.500	1.37	5.567	5.49	8.633	1.60	11.70	0.92
2.533	1.37	5.600	5.49	8.667	1.60	11.73	0.92
2.567	1.37	5.633	5.49	8.700	1.60	11.77	0.92
2.600	1.37	5.667	5.49	8.733	1.60	11.80	0.92
2.633	1.37	5.700	5.49	8.767	1.60	11.83	0.92
2.667	1.37	5.733	5.49	8.800	1.60	11.87	0.92
2.700	1.37	5.767	13.73	8.833	1.60	11.90	0.92
2.733	1.37	5.800	21.97	8.867	1.60	11.93	0.92
2.767	1.37	5.833	21.97	8.900	1.60	11.97	0.92
2.800	1.37	5.867	21.97	8.933	1.60	12.00	0.92
2.833	1.37	5.900	21.97	8.967	1.60	12.03	0.92
2.867	1.37	5.933	21.97	9.000	1.60	12.07	0.92
2.900	1.37	5.967	21.97	9.033	1.60	12.10	0.92
2.933	1.37	6.000	21.97	9.067	1.60	12.13	0.92
2.967	1.37	6.033	60.41	9.100	1.60	12.17	0.92
3.000	1.37	6.067	60.42	9.133	1.60	12.20	0.92
3.033	1.37	6.100	60.42	9.167	1.60	12.23	0.92

3.067	1.37	6.133	60.42	9.200	1.60	12.27	0.46

Max.Eff.Inten.(mm/hr)=		60.42	11.72	
over (min)		5.00	8.00	
Storage Coeff. (min)=		2.00 (ii)	7.92 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.41	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.00	0.043 (iii)
TIME TO PEAK	(hrs)=	6.23	6.30	6.23
RUNOFF VOLUME	(mm)=	43.77	7.40	33.57
TOTAL RAINFALL	(mm)=	45.77	45.77	45.77
RUNOFF COEFFICIENT	=	0.96	0.16	0.73

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.029	6.23	27.00
+ ID2= 2 (0160):	0.34	0.043	6.23	33.57
ID = 3 (0162):	0.65	0.072	6.23	30.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.065	6.23	24.88
+ ID2= 2 (0162):	0.65	0.072	6.23	30.44
ID = 3 (0167):	1.47	0.137	6.23	27.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area	(ha)=	0.11

|ID= 1 DT= 2.0 min | Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.08	0.03
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	27.08	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.37	6.167	60.42	9.23	1.60
0.067	0.00	3.133	1.37	6.200	60.42	9.27	1.60
0.100	0.00	3.167	1.37	6.233	60.42	9.30	1.60
0.133	0.00	3.200	1.37	6.267	34.33	9.33	1.60
0.167	0.00	3.233	1.37	6.300	8.24	9.37	1.60
0.200	0.00	3.267	1.60	6.333	8.24	9.40	1.60
0.233	0.00	3.300	1.83	6.367	8.24	9.43	1.60
0.267	0.57	3.333	1.83	6.400	8.24	9.47	1.60
0.300	1.14	3.367	1.83	6.433	8.24	9.50	1.60
0.333	1.14	3.400	1.83	6.467	8.24	9.53	1.60
0.367	1.14	3.433	1.83	6.500	8.24	9.57	1.60
0.400	1.14	3.467	1.83	6.533	8.24	9.60	1.60
0.433	1.14	3.500	1.83	6.567	8.24	9.63	1.60
0.467	1.14	3.533	1.83	6.600	8.24	9.67	1.60
0.500	1.14	3.567	1.83	6.633	8.24	9.70	1.60
0.533	1.14	3.600	1.83	6.667	8.24	9.73	1.60
0.567	1.14	3.633	1.83	6.700	8.24	9.77	1.60
0.600	1.14	3.667	1.83	6.733	8.24	9.80	1.60
0.633	1.14	3.700	1.83	6.767	5.95	9.83	1.60
0.667	1.14	3.733	1.83	6.800	3.66	9.87	1.60
0.700	1.14	3.767	1.83	6.833	3.66	9.90	1.60
0.733	1.14	3.800	1.83	6.867	3.66	9.93	1.60
0.767	1.14	3.833	1.83	6.900	3.66	9.97	1.60
0.800	1.14	3.867	1.83	6.933	3.66	10.00	1.60
0.833	1.14	3.900	1.83	6.967	3.66	10.03	1.60
0.867	1.14	3.933	1.83	7.000	3.66	10.07	1.60
0.900	1.14	3.967	1.83	7.033	3.66	10.10	1.60
0.933	1.14	4.000	1.83	7.067	3.66	10.13	1.60
0.967	1.14	4.033	1.83	7.100	3.66	10.17	1.60
1.000	1.14	4.067	1.83	7.133	3.66	10.20	1.60
1.033	1.14	4.100	1.83	7.167	3.66	10.23	1.60
1.067	1.14	4.133	1.83	7.200	3.66	10.27	1.26
1.100	1.14	4.167	1.83	7.233	3.66	10.30	0.92
1.133	1.14	4.200	1.83	7.267	3.20	10.33	0.92
1.167	1.14	4.233	1.83	7.300	2.75	10.37	0.92
1.200	1.14	4.267	2.29	7.333	2.75	10.40	0.92
1.233	1.14	4.300	2.75	7.367	2.75	10.43	0.92
1.267	1.14	4.333	2.75	7.400	2.75	10.47	0.92
1.300	1.14	4.367	2.75	7.433	2.75	10.50	0.92
1.333	1.14	4.400	2.75	7.467	2.75	10.53	0.92
1.367	1.14	4.433	2.75	7.500	2.75	10.57	0.92
1.400	1.14	4.467	2.75	7.533	2.75	10.60	0.92
1.433	1.14	4.500	2.75	7.567	2.75	10.63	0.92
1.467	1.14	4.533	2.75	7.600	2.75	10.67	0.92
1.500	1.14	4.567	2.75	7.633	2.75	10.70	0.92
1.533	1.14	4.600	2.75	7.667	2.75	10.73	0.92
1.567	1.14	4.633	2.75	7.700	2.75	10.77	0.92
1.600	1.14	4.667	2.75	7.733	2.75	10.80	0.92
1.633	1.14	4.700	2.75	7.767	2.75	10.83	0.92
1.667	1.14	4.733	2.75	7.800	2.75	10.87	0.92
1.700	1.14	4.767	3.20	7.833	2.75	10.90	0.92
1.733	1.14	4.800	3.66	7.867	2.75	10.93	0.92
1.767	1.14	4.833	3.66	7.900	2.75	10.97	0.92
1.800	1.14	4.867	3.66	7.933	2.75	11.00	0.92
1.833	1.14	4.900	3.66	7.967	2.75	11.03	0.92
1.867	1.14	4.933	3.66	8.000	2.75	11.07	0.92
1.900	1.14	4.967	3.66	8.033	2.75	11.10	0.92
1.933	1.14	5.000	3.66	8.067	2.75	11.13	0.92
1.967	1.14	5.033	3.66	8.100	2.75	11.17	0.92
2.000	1.14	5.067	3.66	8.133	2.75	11.20	0.92
2.033	1.14	5.100	3.66	8.167	2.75	11.23	0.92
2.067	1.14	5.133	3.66	8.200	2.75	11.27	0.92
2.100	1.14	5.167	3.66	8.233	2.75	11.30	0.92
2.133	1.14	5.200	3.66	8.267	2.17	11.33	0.92
2.167	1.14	5.233	3.66	8.300	1.60	11.37	0.92
2.200	1.14	5.267	4.58	8.333	1.60	11.40	0.92
2.233	1.14	5.300	5.49	8.367	1.60	11.43	0.92
2.267	1.26	5.333	5.49	8.400	1.60	11.47	0.92
2.300	1.37	5.367	5.49	8.433	1.60	11.50	0.92
2.333	1.37	5.400	5.49	8.467	1.60	11.53	0.92
2.367	1.37	5.433	5.49	8.500	1.60	11.57	0.92
2.400	1.37	5.467	5.49	8.533	1.60	11.60	0.92
2.433	1.37	5.500	5.49	8.567	1.60	11.63	0.92
2.467	1.37	5.533	5.49	8.600	1.60	11.67	0.92
2.500	1.37	5.567	5.49	8.633	1.60	11.70	0.92
2.533	1.37	5.600	5.49	8.667	1.60	11.73	0.92
2.567	1.37	5.633	5.49	8.700	1.60	11.77	0.92
2.600	1.37	5.667	5.49	8.733	1.60	11.80	0.92
2.633	1.37	5.700	5.49	8.767	1.60	11.83	0.92
2.667	1.37	5.733	5.49	8.800	1.60	11.87	0.92
2.700	1.37	5.767	13.73	8.833	1.60	11.90	0.92
2.733	1.37	5.800	21.97	8.867	1.60	11.93	0.92
2.767	1.37	5.833	21.97	8.900	1.60	11.97	0.92
2.800	1.37	5.867	21.97	8.933	1.60	12.00	0.92
2.833	1.37	5.900	21.97	8.967	1.60	12.03	0.92
2.867	1.37	5.933	21.97	9.000	1.60	12.07	0.92
2.900	1.37	5.967	21.97	9.033	1.60	12.10	0.92
2.933	1.37	6.000	21.97	9.067	1.60	12.13	0.92
2.967	1.37	6.033	60.41	9.100	1.60	12.17	0.92
3.000	1.37	6.067	60.42	9.133	1.60	12.20	0.92
3.033	1.37	6.100	60.42	9.167	1.60	12.23	0.92
3.067	1.37	6.133	60.42	9.200	1.60	12.27	0.46

			TOTALS
Max.Eff.Inten.(mm/hr)=	60.42	11.72	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.43 (ii)	6.87 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.16	
PEAK FLOW (cms)=	0.01	0.00	0.015 (iii)
TIME TO PEAK (hrs)=	6.23	6.30	6.23
RUNOFF VOLUME (mm)=	43.77	7.40	35.03
TOTAL RAINFALL (mm)=	45.77	45.77	45.77
RUNOFF COEFFICIENT =	0.96	0.16	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

V V I SSSSS U U A L (v 6.2.2020)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\f797b700-4093-4838-9cce-22bbc0ec0c0e\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\f797b700-4093-4838-9cce-22bbc0ec0c0e\sc

DATE: 01-16-2026 TIME: 04:29:25

USER:

COMMENTS: _____

** SIMULATION : 12hr SCS 50yr **

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\91c84e44-e32d-4dda-9fa8-0b4aecedc8e1\dac371ca
Ptotal= 81.53 mm	Comments: 12hr SCS 50yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	3.26	6.50	14.68	9.75	2.85
0.25	2.04	3.50	3.26	6.75	6.52	10.00	2.85
0.50	2.04	3.75	3.26	7.00	6.52	10.25	1.63
0.75	2.04	4.00	3.26	7.25	4.89	10.50	1.63
1.00	2.04	4.25	4.89	7.50	4.89	10.75	1.63
1.25	2.04	4.50	4.89	7.75	4.89	11.00	1.63
1.50	2.04	4.75	6.52	8.00	4.89	11.25	1.63
1.75	2.04	5.00	6.52	8.25	2.85	11.50	1.63
2.00	2.04	5.25	9.78	8.50	2.85	11.75	1.63
2.25	2.45	5.50	9.78	8.75	2.85	12.00	1.63
2.50	2.45	5.75	39.13	9.00	2.85		
2.75	2.45	6.00	107.62	9.25	2.85		

3.00	2.45	6.25	14.68	9.50	2.85		

CALIB	
STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.45	6.167	107.62	9.23	2.85
0.067	0.00	3.133	2.45	6.200	107.62	9.27	2.85
0.100	0.00	3.167	2.45	6.233	107.62	9.30	2.85
0.133	0.00	3.200	2.45	6.267	61.16	9.33	2.85
0.167	0.00	3.233	2.45	6.300	14.68	9.37	2.85
0.200	0.00	3.267	2.85	6.333	14.68	9.40	2.85
0.233	0.00	3.300	3.26	6.367	14.68	9.43	2.85
0.267	1.02	3.333	3.26	6.400	14.68	9.47	2.85
0.300	2.04	3.367	3.26	6.433	14.68	9.50	2.85
0.333	2.04	3.400	3.26	6.467	14.68	9.53	2.85
0.367	2.04	3.433	3.26	6.500	14.68	9.57	2.85
0.400	2.04	3.467	3.26	6.533	14.68	9.60	2.85
0.433	2.04	3.500	3.26	6.567	14.68	9.63	2.85
0.467	2.04	3.533	3.26	6.600	14.68	9.67	2.85
0.500	2.04	3.567	3.26	6.633	14.68	9.70	2.85
0.533	2.04	3.600	3.26	6.667	14.68	9.73	2.85
0.567	2.04	3.633	3.26	6.700	14.68	9.77	2.85
0.600	2.04	3.667	3.26	6.733	14.68	9.80	2.85
0.633	2.04	3.700	3.26	6.767	10.60	9.83	2.85
0.667	2.04	3.733	3.26	6.800	6.52	9.87	2.85
0.700	2.04	3.767	3.26	6.833	6.52	9.90	2.85
0.733	2.04	3.800	3.26	6.867	6.52	9.93	2.85
0.767	2.04	3.833	3.26	6.900	6.52	9.97	2.85
0.800	2.04	3.867	3.26	6.933	6.52	10.00	2.85
0.833	2.04	3.900	3.26	6.967	6.52	10.03	2.85
0.867	2.04	3.933	3.26	7.000	6.52	10.07	2.85
0.900	2.04	3.967	3.26	7.033	6.52	10.10	2.85

0.933	2.04	4.000	3.26	7.067	6.52	10.13	2.85
0.967	2.04	4.033	3.26	7.100	6.52	10.17	2.85
1.000	2.04	4.067	3.26	7.133	6.52	10.20	2.85
1.033	2.04	4.100	3.26	7.167	6.52	10.23	2.85
1.067	2.04	4.133	3.26	7.200	6.52	10.27	2.24
1.100	2.04	4.167	3.26	7.233	6.52	10.30	1.63
1.133	2.04	4.200	3.26	7.267	5.71	10.33	1.63
1.167	2.04	4.233	3.26	7.300	4.89	10.37	1.63
1.200	2.04	4.267	4.08	7.333	4.89	10.40	1.63
1.233	2.04	4.300	4.89	7.367	4.89	10.43	1.63
1.267	2.04	4.333	4.89	7.400	4.89	10.47	1.63
1.300	2.04	4.367	4.89	7.433	4.89	10.50	1.63
1.333	2.04	4.400	4.89	7.467	4.89	10.53	1.63
1.367	2.04	4.433	4.89	7.500	4.89	10.57	1.63
1.400	2.04	4.467	4.89	7.533	4.89	10.60	1.63
1.433	2.04	4.500	4.89	7.567	4.89	10.63	1.63
1.467	2.04	4.533	4.89	7.600	4.89	10.67	1.63
1.500	2.04	4.567	4.89	7.633	4.89	10.70	1.63
1.533	2.04	4.600	4.89	7.667	4.89	10.73	1.63
1.567	2.04	4.633	4.89	7.700	4.89	10.77	1.63
1.600	2.04	4.667	4.89	7.733	4.89	10.80	1.63
1.633	2.04	4.700	4.89	7.767	4.89	10.83	1.63
1.667	2.04	4.733	4.89	7.800	4.89	10.87	1.63
1.700	2.04	4.767	5.71	7.833	4.89	10.90	1.63
1.733	2.04	4.800	6.52	7.867	4.89	10.93	1.63
1.767	2.04	4.833	6.52	7.900	4.89	10.97	1.63
1.800	2.04	4.867	6.52	7.933	4.89	11.00	1.63
1.833	2.04	4.900	6.52	7.967	4.89	11.03	1.63
1.867	2.04	4.933	6.52	8.000	4.89	11.07	1.63
1.900	2.04	4.967	6.52	8.033	4.89	11.10	1.63
1.933	2.04	5.000	6.52	8.067	4.89	11.13	1.63
1.967	2.04	5.033	6.52	8.100	4.89	11.17	1.63
2.000	2.04	5.067	6.52	8.133	4.89	11.20	1.63
2.033	2.04	5.100	6.52	8.167	4.89	11.23	1.63
2.067	2.04	5.133	6.52	8.200	4.89	11.27	1.63
2.100	2.04	5.167	6.52	8.233	4.89	11.30	1.63
2.133	2.04	5.200	6.52	8.267	3.87	11.33	1.63
2.167	2.04	5.233	6.52	8.300	2.85	11.37	1.63
2.200	2.04	5.267	8.15	8.333	2.85	11.40	1.63
2.233	2.04	5.300	9.78	8.367	2.85	11.43	1.63
2.267	2.24	5.333	9.78	8.400	2.85	11.47	1.63
2.300	2.45	5.367	9.78	8.433	2.85	11.50	1.63
2.333	2.45	5.400	9.78	8.467	2.85	11.53	1.63
2.367	2.45	5.433	9.78	8.500	2.85	11.57	1.63
2.400	2.45	5.467	9.78	8.533	2.85	11.60	1.63
2.433	2.45	5.500	9.78	8.567	2.85	11.63	1.63
2.467	2.45	5.533	9.78	8.600	2.85	11.67	1.63
2.500	2.45	5.567	9.78	8.633	2.85	11.70	1.63
2.533	2.45	5.600	9.78	8.667	2.85	11.73	1.63

2.567	2.45	5.633	9.78	8.700	2.85	11.77	1.63
2.600	2.45	5.667	9.78	8.733	2.85	11.80	1.63
2.633	2.45	5.700	9.78	8.767	2.85	11.83	1.63
2.667	2.45	5.733	9.78	8.800	2.85	11.87	1.63
2.700	2.45	5.767	24.46	8.833	2.85	11.90	1.63
2.733	2.45	5.800	39.13	8.867	2.85	11.93	1.63
2.767	2.45	5.833	39.13	8.900	2.85	11.97	1.63
2.800	2.45	5.867	39.13	8.933	2.85	12.00	1.63
2.833	2.45	5.900	39.13	8.967	2.85	12.03	1.63
2.867	2.45	5.933	39.13	9.000	2.85	12.07	1.63
2.900	2.45	5.967	39.13	9.033	2.85	12.10	1.63
2.933	2.45	6.000	39.13	9.067	2.85	12.13	1.63
2.967	2.45	6.033	107.61	9.100	2.85	12.17	1.63
3.000	2.45	6.067	107.62	9.133	2.85	12.20	1.63
3.033	2.45	6.100	107.62	9.167	2.85	12.23	1.63
3.067	2.45	6.133	107.62	9.200	2.85	12.27	0.81

Max.Eff.Inten.(mm/hr)=		107.62	52.36	
over (min)		5.00	6.00	
Storage Coeff. (min)=		1.13 (ii)	5.36 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.50	0.20	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK	(hrs)=	6.23	6.27	6.23
RUNOFF VOLUME	(mm)=	79.53	32.49	68.69
TOTAL RAINFALL	(mm)=	81.53	81.53	81.53
RUNOFF COEFFICIENT	=	0.98	0.40	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.45	6.167	107.62	9.23	2.85
0.067	0.00	3.133	2.45	6.200	107.62	9.27	2.85
0.100	0.00	3.167	2.45	6.233	107.62	9.30	2.85
0.133	0.00	3.200	2.45	6.267	61.16	9.33	2.85
0.167	0.00	3.233	2.45	6.300	14.68	9.37	2.85
0.200	0.00	3.267	2.85	6.333	14.68	9.40	2.85
0.233	0.00	3.300	3.26	6.367	14.68	9.43	2.85
0.267	1.02	3.333	3.26	6.400	14.68	9.47	2.85
0.300	2.04	3.367	3.26	6.433	14.68	9.50	2.85
0.333	2.04	3.400	3.26	6.467	14.68	9.53	2.85
0.367	2.04	3.433	3.26	6.500	14.68	9.57	2.85
0.400	2.04	3.467	3.26	6.533	14.68	9.60	2.85
0.433	2.04	3.500	3.26	6.567	14.68	9.63	2.85
0.467	2.04	3.533	3.26	6.600	14.68	9.67	2.85
0.500	2.04	3.567	3.26	6.633	14.68	9.70	2.85
0.533	2.04	3.600	3.26	6.667	14.68	9.73	2.85
0.567	2.04	3.633	3.26	6.700	14.68	9.77	2.85
0.600	2.04	3.667	3.26	6.733	14.68	9.80	2.85
0.633	2.04	3.700	3.26	6.767	10.60	9.83	2.85
0.667	2.04	3.733	3.26	6.800	6.52	9.87	2.85
0.700	2.04	3.767	3.26	6.833	6.52	9.90	2.85
0.733	2.04	3.800	3.26	6.867	6.52	9.93	2.85
0.767	2.04	3.833	3.26	6.900	6.52	9.97	2.85
0.800	2.04	3.867	3.26	6.933	6.52	10.00	2.85
0.833	2.04	3.900	3.26	6.967	6.52	10.03	2.85
0.867	2.04	3.933	3.26	7.000	6.52	10.07	2.85
0.900	2.04	3.967	3.26	7.033	6.52	10.10	2.85
0.933	2.04	4.000	3.26	7.067	6.52	10.13	2.85
0.967	2.04	4.033	3.26	7.100	6.52	10.17	2.85
1.000	2.04	4.067	3.26	7.133	6.52	10.20	2.85
1.033	2.04	4.100	3.26	7.167	6.52	10.23	2.85
1.067	2.04	4.133	3.26	7.200	6.52	10.27	2.24
1.100	2.04	4.167	3.26	7.233	6.52	10.30	1.63
1.133	2.04	4.200	3.26	7.267	5.71	10.33	1.63
1.167	2.04	4.233	3.26	7.300	4.89	10.37	1.63
1.200	2.04	4.267	4.08	7.333	4.89	10.40	1.63
1.233	2.04	4.300	4.89	7.367	4.89	10.43	1.63
1.267	2.04	4.333	4.89	7.400	4.89	10.47	1.63
1.300	2.04	4.367	4.89	7.433	4.89	10.50	1.63
1.333	2.04	4.400	4.89	7.467	4.89	10.53	1.63
1.367	2.04	4.433	4.89	7.500	4.89	10.57	1.63
1.400	2.04	4.467	4.89	7.533	4.89	10.60	1.63

1.433	2.04	4.500	4.89	7.567	4.89	10.63	1.63
1.467	2.04	4.533	4.89	7.600	4.89	10.67	1.63
1.500	2.04	4.567	4.89	7.633	4.89	10.70	1.63
1.533	2.04	4.600	4.89	7.667	4.89	10.73	1.63
1.567	2.04	4.633	4.89	7.700	4.89	10.77	1.63
1.600	2.04	4.667	4.89	7.733	4.89	10.80	1.63
1.633	2.04	4.700	4.89	7.767	4.89	10.83	1.63
1.667	2.04	4.733	4.89	7.800	4.89	10.87	1.63
1.700	2.04	4.767	5.71	7.833	4.89	10.90	1.63
1.733	2.04	4.800	6.52	7.867	4.89	10.93	1.63
1.767	2.04	4.833	6.52	7.900	4.89	10.97	1.63
1.800	2.04	4.867	6.52	7.933	4.89	11.00	1.63
1.833	2.04	4.900	6.52	7.967	4.89	11.03	1.63
1.867	2.04	4.933	6.52	8.000	4.89	11.07	1.63
1.900	2.04	4.967	6.52	8.033	4.89	11.10	1.63
1.933	2.04	5.000	6.52	8.067	4.89	11.13	1.63
1.967	2.04	5.033	6.52	8.100	4.89	11.17	1.63
2.000	2.04	5.067	6.52	8.133	4.89	11.20	1.63
2.033	2.04	5.100	6.52	8.167	4.89	11.23	1.63
2.067	2.04	5.133	6.52	8.200	4.89	11.27	1.63
2.100	2.04	5.167	6.52	8.233	4.89	11.30	1.63
2.133	2.04	5.200	6.52	8.267	3.87	11.33	1.63
2.167	2.04	5.233	6.52	8.300	2.85	11.37	1.63
2.200	2.04	5.267	8.15	8.333	2.85	11.40	1.63
2.233	2.04	5.300	9.78	8.367	2.85	11.43	1.63
2.267	2.24	5.333	9.78	8.400	2.85	11.47	1.63
2.300	2.45	5.367	9.78	8.433	2.85	11.50	1.63
2.333	2.45	5.400	9.78	8.467	2.85	11.53	1.63
2.367	2.45	5.433	9.78	8.500	2.85	11.57	1.63
2.400	2.45	5.467	9.78	8.533	2.85	11.60	1.63
2.433	2.45	5.500	9.78	8.567	2.85	11.63	1.63
2.467	2.45	5.533	9.78	8.600	2.85	11.67	1.63
2.500	2.45	5.567	9.78	8.633	2.85	11.70	1.63
2.533	2.45	5.600	9.78	8.667	2.85	11.73	1.63
2.567	2.45	5.633	9.78	8.700	2.85	11.77	1.63
2.600	2.45	5.667	9.78	8.733	2.85	11.80	1.63
2.633	2.45	5.700	9.78	8.767	2.85	11.83	1.63
2.667	2.45	5.733	9.78	8.800	2.85	11.87	1.63
2.700	2.45	5.767	24.46	8.833	2.85	11.90	1.63
2.733	2.45	5.800	39.13	8.867	2.85	11.93	1.63
2.767	2.45	5.833	39.13	8.900	2.85	11.97	1.63
2.800	2.45	5.867	39.13	8.933	2.85	12.00	1.63
2.833	2.45	5.900	39.13	8.967	2.85	12.03	1.63
2.867	2.45	5.933	39.13	9.000	2.85	12.07	1.63
2.900	2.45	5.967	39.13	9.033	2.85	12.10	1.63
2.933	2.45	6.000	39.13	9.067	2.85	12.13	1.63
2.967	2.45	6.033	107.61	9.100	2.85	12.17	1.63
3.000	2.45	6.067	107.62	9.133	2.85	12.20	1.63
3.033	2.45	6.100	107.62	9.167	2.85	12.23	1.63

				3.067	2.45	6.133 107.62	9.200 2.85	12.27 0.81

```
     Max.Eff.Inten.(mm/hr)=     107.62        52.36
               over (min)         5.00        12.00
     Storage Coeff.  (min)=       1.98 (ii)   11.12 (ii)
     Unit Hyd. Tpeak (min)=       4.00        12.00
     Unit Hyd. peak  (cms)=       0.41         0.10
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.04         0.112 (iii)
     TIME TO PEAK    (hrs)=       6.23         6.33          6.23
     RUNOFF VOLUME    (mm)=      79.53        32.49         49.41
     TOTAL RAINFALL   (mm)=      81.53        81.53         81.53
     RUNOFF COEFFICIENT   =       0.98         0.40          0.61

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  71.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0122)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0110):     0.71   0.112     6.23    49.41
     + ID2= 2 (  0120):     0.11   0.029     6.23    68.69
       ================================================
       ID = 3 (  0122):     0.82   0.141     6.23    52.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0150)|   Area    (ha)=   0.31
|ID= 1 DT= 2.0 min |   Total Imp(%)=  54.00   Dir. Conn.(%)=  54.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.17         0.14
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      45.46        40.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```


---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.45	6.167	107.62	9.23	2.85
0.067	0.00	3.133	2.45	6.200	107.62	9.27	2.85
0.100	0.00	3.167	2.45	6.233	107.62	9.30	2.85
0.133	0.00	3.200	2.45	6.267	61.16	9.33	2.85
0.167	0.00	3.233	2.45	6.300	14.68	9.37	2.85
0.200	0.00	3.267	2.85	6.333	14.68	9.40	2.85
0.233	0.00	3.300	3.26	6.367	14.68	9.43	2.85
0.267	1.02	3.333	3.26	6.400	14.68	9.47	2.85
0.300	2.04	3.367	3.26	6.433	14.68	9.50	2.85
0.333	2.04	3.400	3.26	6.467	14.68	9.53	2.85
0.367	2.04	3.433	3.26	6.500	14.68	9.57	2.85
0.400	2.04	3.467	3.26	6.533	14.68	9.60	2.85
0.433	2.04	3.500	3.26	6.567	14.68	9.63	2.85
0.467	2.04	3.533	3.26	6.600	14.68	9.67	2.85
0.500	2.04	3.567	3.26	6.633	14.68	9.70	2.85
0.533	2.04	3.600	3.26	6.667	14.68	9.73	2.85
0.567	2.04	3.633	3.26	6.700	14.68	9.77	2.85
0.600	2.04	3.667	3.26	6.733	14.68	9.80	2.85
0.633	2.04	3.700	3.26	6.767	10.60	9.83	2.85
0.667	2.04	3.733	3.26	6.800	6.52	9.87	2.85
0.700	2.04	3.767	3.26	6.833	6.52	9.90	2.85
0.733	2.04	3.800	3.26	6.867	6.52	9.93	2.85
0.767	2.04	3.833	3.26	6.900	6.52	9.97	2.85
0.800	2.04	3.867	3.26	6.933	6.52	10.00	2.85
0.833	2.04	3.900	3.26	6.967	6.52	10.03	2.85
0.867	2.04	3.933	3.26	7.000	6.52	10.07	2.85
0.900	2.04	3.967	3.26	7.033	6.52	10.10	2.85
0.933	2.04	4.000	3.26	7.067	6.52	10.13	2.85
0.967	2.04	4.033	3.26	7.100	6.52	10.17	2.85
1.000	2.04	4.067	3.26	7.133	6.52	10.20	2.85
1.033	2.04	4.100	3.26	7.167	6.52	10.23	2.85
1.067	2.04	4.133	3.26	7.200	6.52	10.27	2.24
1.100	2.04	4.167	3.26	7.233	6.52	10.30	1.63
1.133	2.04	4.200	3.26	7.267	5.71	10.33	1.63
1.167	2.04	4.233	3.26	7.300	4.89	10.37	1.63
1.200	2.04	4.267	4.08	7.333	4.89	10.40	1.63
1.233	2.04	4.300	4.89	7.367	4.89	10.43	1.63
1.267	2.04	4.333	4.89	7.400	4.89	10.47	1.63
1.300	2.04	4.367	4.89	7.433	4.89	10.50	1.63
1.333	2.04	4.400	4.89	7.467	4.89	10.53	1.63
1.367	2.04	4.433	4.89	7.500	4.89	10.57	1.63
1.400	2.04	4.467	4.89	7.533	4.89	10.60	1.63
1.433	2.04	4.500	4.89	7.567	4.89	10.63	1.63
1.467	2.04	4.533	4.89	7.600	4.89	10.67	1.63
1.500	2.04	4.567	4.89	7.633	4.89	10.70	1.63

1.533	2.04	4.600	4.89	7.667	4.89	10.73	1.63
1.567	2.04	4.633	4.89	7.700	4.89	10.77	1.63
1.600	2.04	4.667	4.89	7.733	4.89	10.80	1.63
1.633	2.04	4.700	4.89	7.767	4.89	10.83	1.63
1.667	2.04	4.733	4.89	7.800	4.89	10.87	1.63
1.700	2.04	4.767	5.71	7.833	4.89	10.90	1.63
1.733	2.04	4.800	6.52	7.867	4.89	10.93	1.63
1.767	2.04	4.833	6.52	7.900	4.89	10.97	1.63
1.800	2.04	4.867	6.52	7.933	4.89	11.00	1.63
1.833	2.04	4.900	6.52	7.967	4.89	11.03	1.63
1.867	2.04	4.933	6.52	8.000	4.89	11.07	1.63
1.900	2.04	4.967	6.52	8.033	4.89	11.10	1.63
1.933	2.04	5.000	6.52	8.067	4.89	11.13	1.63
1.967	2.04	5.033	6.52	8.100	4.89	11.17	1.63
2.000	2.04	5.067	6.52	8.133	4.89	11.20	1.63
2.033	2.04	5.100	6.52	8.167	4.89	11.23	1.63
2.067	2.04	5.133	6.52	8.200	4.89	11.27	1.63
2.100	2.04	5.167	6.52	8.233	4.89	11.30	1.63
2.133	2.04	5.200	6.52	8.267	3.87	11.33	1.63
2.167	2.04	5.233	6.52	8.300	2.85	11.37	1.63
2.200	2.04	5.267	8.15	8.333	2.85	11.40	1.63
2.233	2.04	5.300	9.78	8.367	2.85	11.43	1.63
2.267	2.24	5.333	9.78	8.400	2.85	11.47	1.63
2.300	2.45	5.367	9.78	8.433	2.85	11.50	1.63
2.333	2.45	5.400	9.78	8.467	2.85	11.53	1.63
2.367	2.45	5.433	9.78	8.500	2.85	11.57	1.63
2.400	2.45	5.467	9.78	8.533	2.85	11.60	1.63
2.433	2.45	5.500	9.78	8.567	2.85	11.63	1.63
2.467	2.45	5.533	9.78	8.600	2.85	11.67	1.63
2.500	2.45	5.567	9.78	8.633	2.85	11.70	1.63
2.533	2.45	5.600	9.78	8.667	2.85	11.73	1.63
2.567	2.45	5.633	9.78	8.700	2.85	11.77	1.63
2.600	2.45	5.667	9.78	8.733	2.85	11.80	1.63
2.633	2.45	5.700	9.78	8.767	2.85	11.83	1.63
2.667	2.45	5.733	9.78	8.800	2.85	11.87	1.63
2.700	2.45	5.767	24.46	8.833	2.85	11.90	1.63
2.733	2.45	5.800	39.13	8.867	2.85	11.93	1.63
2.767	2.45	5.833	39.13	8.900	2.85	11.97	1.63
2.800	2.45	5.867	39.13	8.933	2.85	12.00	1.63
2.833	2.45	5.900	39.13	8.967	2.85	12.03	1.63
2.867	2.45	5.933	39.13	9.000	2.85	12.07	1.63
2.900	2.45	5.967	39.13	9.033	2.85	12.10	1.63
2.933	2.45	6.000	39.13	9.067	2.85	12.13	1.63
2.967	2.45	6.033	107.61	9.100	2.85	12.17	1.63
3.000	2.45	6.067	107.62	9.133	2.85	12.20	1.63
3.033	2.45	6.100	107.62	9.167	2.85	12.23	1.63
3.067	2.45	6.133	107.62	9.200	2.85	12.27	0.81

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     Max.Eff.Inten.(mm/hr)=     107.62        35.74
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over (min)		5.00	8.00
Storage Coeff. (min)=		1.55 (ii)	7.97 (ii)
Unit Hyd. Tpeak (min)=		4.00	8.00
Unit Hyd. peak (cms)=		0.45	0.14
			TOTALS
PEAK FLOW	(cms)=	0.05	0.01 0.060 (iii)
TIME TO PEAK	(hrs)=	6.23	6.30 6.23
RUNOFF VOLUME	(mm)=	79.53	22.49 53.28
TOTAL RAINFALL	(mm)=	81.53	81.53 81.53
RUNOFF COEFFICIENT	=	0.98	0.28 0.65

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)=	0.34	
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.45	6.167	107.62	9.23	2.85
0.067	0.00	3.133	2.45	6.200	107.62	9.27	2.85
0.100	0.00	3.167	2.45	6.233	107.62	9.30	2.85
0.133	0.00	3.200	2.45	6.267	61.16	9.33	2.85
0.167	0.00	3.233	2.45	6.300	14.68	9.37	2.85
0.200	0.00	3.267	2.85	6.333	14.68	9.40	2.85
0.233	0.00	3.300	3.26	6.367	14.68	9.43	2.85
0.267	1.02	3.333	3.26	6.400	14.68	9.47	2.85
0.300	2.04	3.367	3.26	6.433	14.68	9.50	2.85
0.333	2.04	3.400	3.26	6.467	14.68	9.53	2.85
0.367	2.04	3.433	3.26	6.500	14.68	9.57	2.85
0.400	2.04	3.467	3.26	6.533	14.68	9.60	2.85
0.433	2.04	3.500	3.26	6.567	14.68	9.63	2.85
0.467	2.04	3.533	3.26	6.600	14.68	9.67	2.85
0.500	2.04	3.567	3.26	6.633	14.68	9.70	2.85
0.533	2.04	3.600	3.26	6.667	14.68	9.73	2.85
0.567	2.04	3.633	3.26	6.700	14.68	9.77	2.85
0.600	2.04	3.667	3.26	6.733	14.68	9.80	2.85
0.633	2.04	3.700	3.26	6.767	10.60	9.83	2.85
0.667	2.04	3.733	3.26	6.800	6.52	9.87	2.85
0.700	2.04	3.767	3.26	6.833	6.52	9.90	2.85
0.733	2.04	3.800	3.26	6.867	6.52	9.93	2.85
0.767	2.04	3.833	3.26	6.900	6.52	9.97	2.85
0.800	2.04	3.867	3.26	6.933	6.52	10.00	2.85
0.833	2.04	3.900	3.26	6.967	6.52	10.03	2.85
0.867	2.04	3.933	3.26	7.000	6.52	10.07	2.85
0.900	2.04	3.967	3.26	7.033	6.52	10.10	2.85
0.933	2.04	4.000	3.26	7.067	6.52	10.13	2.85
0.967	2.04	4.033	3.26	7.100	6.52	10.17	2.85
1.000	2.04	4.067	3.26	7.133	6.52	10.20	2.85
1.033	2.04	4.100	3.26	7.167	6.52	10.23	2.85
1.067	2.04	4.133	3.26	7.200	6.52	10.27	2.24
1.100	2.04	4.167	3.26	7.233	6.52	10.30	1.63
1.133	2.04	4.200	3.26	7.267	5.71	10.33	1.63
1.167	2.04	4.233	3.26	7.300	4.89	10.37	1.63
1.200	2.04	4.267	4.08	7.333	4.89	10.40	1.63
1.233	2.04	4.300	4.89	7.367	4.89	10.43	1.63
1.267	2.04	4.333	4.89	7.400	4.89	10.47	1.63
1.300	2.04	4.367	4.89	7.433	4.89	10.50	1.63
1.333	2.04	4.400	4.89	7.467	4.89	10.53	1.63
1.367	2.04	4.433	4.89	7.500	4.89	10.57	1.63
1.400	2.04	4.467	4.89	7.533	4.89	10.60	1.63
1.433	2.04	4.500	4.89	7.567	4.89	10.63	1.63
1.467	2.04	4.533	4.89	7.600	4.89	10.67	1.63
1.500	2.04	4.567	4.89	7.633	4.89	10.70	1.63
1.533	2.04	4.600	4.89	7.667	4.89	10.73	1.63
1.567	2.04	4.633	4.89	7.700	4.89	10.77	1.63
1.600	2.04	4.667	4.89	7.733	4.89	10.80	1.63
1.633	2.04	4.700	4.89	7.767	4.89	10.83	1.63
1.667	2.04	4.733	4.89	7.800	4.89	10.87	1.63
1.700	2.04	4.767	5.71	7.833	4.89	10.90	1.63
1.733	2.04	4.800	6.52	7.867	4.89	10.93	1.63
1.767	2.04	4.833	6.52	7.900	4.89	10.97	1.63
1.800	2.04	4.867	6.52	7.933	4.89	11.00	1.63
1.833	2.04	4.900	6.52	7.967	4.89	11.03	1.63
1.867	2.04	4.933	6.52	8.000	4.89	11.07	1.63
1.900	2.04	4.967	6.52	8.033	4.89	11.10	1.63
1.933	2.04	5.000	6.52	8.067	4.89	11.13	1.63
1.967	2.04	5.033	6.52	8.100	4.89	11.17	1.63
2.000	2.04	5.067	6.52	8.133	4.89	11.20	1.63

SCS 12 hr_Exsting Conditions

2.033	2.04	5.100	6.52	8.167	4.89	11.23	1.63
2.067	2.04	5.133	6.52	8.200	4.89	11.27	1.63
2.100	2.04	5.167	6.52	8.233	4.89	11.30	1.63
2.133	2.04	5.200	6.52	8.267	3.87	11.33	1.63
2.167	2.04	5.233	6.52	8.300	2.85	11.37	1.63
2.200	2.04	5.267	8.15	8.333	2.85	11.40	1.63
2.233	2.04	5.300	9.78	8.367	2.85	11.43	1.63
2.267	2.24	5.333	9.78	8.400	2.85	11.47	1.63
2.300	2.45	5.367	9.78	8.433	2.85	11.50	1.63
2.333	2.45	5.400	9.78	8.467	2.85	11.53	1.63
2.367	2.45	5.433	9.78	8.500	2.85	11.57	1.63
2.400	2.45	5.467	9.78	8.533	2.85	11.60	1.63
2.433	2.45	5.500	9.78	8.567	2.85	11.63	1.63
2.467	2.45	5.533	9.78	8.600	2.85	11.67	1.63
2.500	2.45	5.567	9.78	8.633	2.85	11.70	1.63
2.533	2.45	5.600	9.78	8.667	2.85	11.73	1.63
2.567	2.45	5.633	9.78	8.700	2.85	11.77	1.63
2.600	2.45	5.667	9.78	8.733	2.85	11.80	1.63
2.633	2.45	5.700	9.78	8.767	2.85	11.83	1.63
2.667	2.45	5.733	9.78	8.800	2.85	11.87	1.63
2.700	2.45	5.767	24.46	8.833	2.85	11.90	1.63
2.733	2.45	5.800	39.13	8.867	2.85	11.93	1.63
2.767	2.45	5.833	39.13	8.900	2.85	11.97	1.63
2.800	2.45	5.867	39.13	8.933	2.85	12.00	1.63
2.833	2.45	5.900	39.13	8.967	2.85	12.03	1.63
2.867	2.45	5.933	39.13	9.000	2.85	12.07	1.63
2.900	2.45	5.967	39.13	9.033	2.85	12.10	1.63
2.933	2.45	6.000	39.13	9.067	2.85	12.13	1.63
2.967	2.45	6.033	107.61	9.100	2.85	12.17	1.63
3.000	2.45	6.067	107.62	9.133	2.85	12.20	1.63
3.033	2.45	6.100	107.62	9.167	2.85	12.23	1.63
3.067	2.45	6.133	107.62	9.200	2.85	12.27	0.81

Max.Eff.Inten.(mm/hr)= 107.62 35.74

over (min)		5.00	8.00
Storage Coeff. (min)=		1.59 (ii)	6.29 (ii)
Unit Hyd. Tpeak (min)=		4.00	8.00
Unit Hyd. peak (cms)=		0.45	0.16
			TOTALS
PEAK FLOW	(cms)=	0.07	0.01 0.081 (iii)
TIME TO PEAK	(hrs)=	6.23	6.27 6.23
RUNOFF VOLUME	(mm)=	79.53	22.49 63.55
TOTAL RAINFALL	(mm)=	81.53	81.53 81.53
RUNOFF COEFFICIENT	=	0.98	0.28 0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)

SCS 12 hr_Exsting Conditions

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.060	6.23	53.28
+ ID2= 2 (0160):	0.34	0.081	6.23	63.55
ID = 3 (0162):	0.65	0.141	6.23	58.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.141	6.23	52.00
+ ID2= 2 (0162):	0.65	0.141	6.23	58.65
ID = 3 (0167):	1.47	0.281	6.23	54.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)=	0.11	
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.45	6.167	107.62	9.23	2.85
0.067	0.00	3.133	2.45	6.200	107.62	9.27	2.85

0.100	0.00	3.167	2.45	6.233	107.62	9.30	2.85
0.133	0.00	3.200	2.45	6.267	61.16	9.33	2.85
0.167	0.00	3.233	2.45	6.300	14.68	9.37	2.85
0.200	0.00	3.267	2.85	6.333	14.68	9.40	2.85
0.233	0.00	3.300	3.26	6.367	14.68	9.43	2.85
0.267	1.02	3.333	3.26	6.400	14.68	9.47	2.85
0.300	2.04	3.367	3.26	6.433	14.68	9.50	2.85
0.333	2.04	3.400	3.26	6.467	14.68	9.53	2.85
0.367	2.04	3.433	3.26	6.500	14.68	9.57	2.85
0.400	2.04	3.467	3.26	6.533	14.68	9.60	2.85
0.433	2.04	3.500	3.26	6.567	14.68	9.63	2.85
0.467	2.04	3.533	3.26	6.600	14.68	9.67	2.85
0.500	2.04	3.567	3.26	6.633	14.68	9.70	2.85
0.533	2.04	3.600	3.26	6.667	14.68	9.73	2.85
0.567	2.04	3.633	3.26	6.700	14.68	9.77	2.85
0.600	2.04	3.667	3.26	6.733	14.68	9.80	2.85
0.633	2.04	3.700	3.26	6.767	10.60	9.83	2.85
0.667	2.04	3.733	3.26	6.800	6.52	9.87	2.85
0.700	2.04	3.767	3.26	6.833	6.52	9.90	2.85
0.733	2.04	3.800	3.26	6.867	6.52	9.93	2.85
0.767	2.04	3.833	3.26	6.900	6.52	9.97	2.85
0.800	2.04	3.867	3.26	6.933	6.52	10.00	2.85
0.833	2.04	3.900	3.26	6.967	6.52	10.03	2.85
0.867	2.04	3.933	3.26	7.000	6.52	10.07	2.85
0.900	2.04	3.967	3.26	7.033	6.52	10.10	2.85
0.933	2.04	4.000	3.26	7.067	6.52	10.13	2.85
0.967	2.04	4.033	3.26	7.100	6.52	10.17	2.85
1.000	2.04	4.067	3.26	7.133	6.52	10.20	2.85
1.033	2.04	4.100	3.26	7.167	6.52	10.23	2.85
1.067	2.04	4.133	3.26	7.200	6.52	10.27	2.24
1.100	2.04	4.167	3.26	7.233	6.52	10.30	1.63
1.133	2.04	4.200	3.26	7.267	5.71	10.33	1.63
1.167	2.04	4.233	3.26	7.300	4.89	10.37	1.63
1.200	2.04	4.267	4.08	7.333	4.89	10.40	1.63
1.233	2.04	4.300	4.89	7.367	4.89	10.43	1.63
1.267	2.04	4.333	4.89	7.400	4.89	10.47	1.63
1.300	2.04	4.367	4.89	7.433	4.89	10.50	1.63
1.333	2.04	4.400	4.89	7.467	4.89	10.53	1.63
1.367	2.04	4.433	4.89	7.500	4.89	10.57	1.63
1.400	2.04	4.467	4.89	7.533	4.89	10.60	1.63
1.433	2.04	4.500	4.89	7.567	4.89	10.63	1.63
1.467	2.04	4.533	4.89	7.600	4.89	10.67	1.63
1.500	2.04	4.567	4.89	7.633	4.89	10.70	1.63
1.533	2.04	4.600	4.89	7.667	4.89	10.73	1.63
1.567	2.04	4.633	4.89	7.700	4.89	10.77	1.63
1.600	2.04	4.667	4.89	7.733	4.89	10.80	1.63
1.633	2.04	4.700	4.89	7.767	4.89	10.83	1.63
1.667	2.04	4.733	4.89	7.800	4.89	10.87	1.63
1.700	2.04	4.767	5.71	7.833	4.89	10.90	1.63

1.733	2.04	4.800	6.52	7.867	4.89	10.93	1.63
1.767	2.04	4.833	6.52	7.900	4.89	10.97	1.63
1.800	2.04	4.867	6.52	7.933	4.89	11.00	1.63
1.833	2.04	4.900	6.52	7.967	4.89	11.03	1.63
1.867	2.04	4.933	6.52	8.000	4.89	11.07	1.63
1.900	2.04	4.967	6.52	8.033	4.89	11.10	1.63
1.933	2.04	5.000	6.52	8.067	4.89	11.13	1.63
1.967	2.04	5.033	6.52	8.100	4.89	11.17	1.63
2.000	2.04	5.067	6.52	8.133	4.89	11.20	1.63
2.033	2.04	5.100	6.52	8.167	4.89	11.23	1.63
2.067	2.04	5.133	6.52	8.200	4.89	11.27	1.63
2.100	2.04	5.167	6.52	8.233	4.89	11.30	1.63
2.133	2.04	5.200	6.52	8.267	3.87	11.33	1.63
2.167	2.04	5.233	6.52	8.300	2.85	11.37	1.63
2.200	2.04	5.267	8.15	8.333	2.85	11.40	1.63
2.233	2.04	5.300	9.78	8.367	2.85	11.43	1.63
2.267	2.24	5.333	9.78	8.400	2.85	11.47	1.63
2.300	2.45	5.367	9.78	8.433	2.85	11.50	1.63
2.333	2.45	5.400	9.78	8.467	2.85	11.53	1.63
2.367	2.45	5.433	9.78	8.500	2.85	11.57	1.63
2.400	2.45	5.467	9.78	8.533	2.85	11.60	1.63
2.433	2.45	5.500	9.78	8.567	2.85	11.63	1.63
2.467	2.45	5.533	9.78	8.600	2.85	11.67	1.63
2.500	2.45	5.567	9.78	8.633	2.85	11.70	1.63
2.533	2.45	5.600	9.78	8.667	2.85	11.73	1.63
2.567	2.45	5.633	9.78	8.700	2.85	11.77	1.63
2.600	2.45	5.667	9.78	8.733	2.85	11.80	1.63
2.633	2.45	5.700	9.78	8.767	2.85	11.83	1.63
2.667	2.45	5.733	9.78	8.800	2.85	11.87	1.63
2.700	2.45	5.767	24.46	8.833	2.85	11.90	1.63
2.733	2.45	5.800	39.13	8.867	2.85	11.93	1.63
2.767	2.45	5.833	39.13	8.900	2.85	11.97	1.63
2.800	2.45	5.867	39.13	8.933	2.85	12.00	1.63
2.833	2.45	5.900	39.13	8.967	2.85	12.03	1.63
2.867	2.45	5.933	39.13	9.000	2.85	12.07	1.63
2.900	2.45	5.967	39.13	9.033	2.85	12.10	1.63
2.933	2.45	6.000	39.13	9.067	2.85	12.13	1.63
2.967	2.45	6.033	107.61	9.100	2.85	12.17	1.63
3.000	2.45	6.067	107.62	9.133	2.85	12.20	1.63
3.033	2.45	6.100	107.62	9.167	2.85	12.23	1.63
3.067	2.45	6.133	107.62	9.200	2.85	12.27	0.81

Max.Eff.Inten.(mm/hr)=	107.62	35.74	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.13 (ii)	5.45 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.027 (iii)

TIME TO PEAK (hrs)=	6.23	6.27	6.23
RUNOFF VOLUME (mm)=	79.53	22.49	65.82
TOTAL RAINFALL (mm)=	81.53	81.53	81.53
RUNOFF COEFFICIENT =	0.98	0.28	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
V    V   I    SSSSS  U   U    A    L             (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

  OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
 O   O    T      T    H   H   Y Y   MM MM  O   O
 O   O    T      T    H   H    Y    M   M  O   O
  OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\78a9b352-9cb0-4716-845d-505aff21aced\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\78a9b352-9cb0-4716-845d-505aff21aced\sc

DATE: 01-16-2026 TIME: 04:29:25

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : 12hr SCS 5yr                 **
  ***********************************************
```

```
|    READ STORM    |    Filename: C:\Users\Yuan.Yuan\AppD
|                  |              ata\Local\Temp\
|                  |              91c84e44-e32d-4dda-9fa8-0b4aecedc8e1\28bd6162
| Ptotal= 54.79 mm |    Comments: 12hr SCS 5yr
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	2.19	6.50	9.86	9.75	1.92
0.25	1.37	3.50	2.19	6.75	4.38	10.00	1.92
0.50	1.37	3.75	2.19	7.00	4.38	10.25	1.10
0.75	1.37	4.00	2.19	7.25	3.29	10.50	1.10
1.00	1.37	4.25	3.29	7.50	3.29	10.75	1.10
1.25	1.37	4.50	3.29	7.75	3.29	11.00	1.10
1.50	1.37	4.75	4.38	8.00	3.29	11.25	1.10
1.75	1.37	5.00	4.38	8.25	1.92	11.50	1.10
2.00	1.37	5.25	6.57	8.50	1.92	11.75	1.10
2.25	1.64	5.50	6.57	8.75	1.92	12.00	1.10
2.50	1.64	5.75	26.30	9.00	1.92		
2.75	1.64	6.00	72.32	9.25	1.92		
3.00	1.64	6.25	9.86	9.50	1.92		

```
| CALIB          |
| STANDHYD (  0120)|   Area    (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  77.00   Dir. Conn.(%)=  77.00
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.64	6.167	72.32	9.23	1.92
0.067	0.00	3.133	1.64	6.200	72.32	9.27	1.92
0.100	0.00	3.167	1.64	6.233	72.32	9.30	1.92
0.133	0.00	3.200	1.64	6.267	41.10	9.33	1.92
0.167	0.00	3.233	1.64	6.300	9.86	9.37	1.92
0.200	0.00	3.267	1.92	6.333	9.86	9.40	1.92
0.233	0.00	3.300	2.19	6.367	9.86	9.43	1.92
0.267	0.68	3.333	2.19	6.400	9.86	9.47	1.92
0.300	1.37	3.367	2.19	6.433	9.86	9.50	1.92
0.333	1.37	3.400	2.19	6.467	9.86	9.53	1.92
0.367	1.37	3.433	2.19	6.500	9.86	9.57	1.92
0.400	1.37	3.467	2.19	6.533	9.86	9.60	1.92
0.433	1.37	3.500	2.19	6.567	9.86	9.63	1.92
0.467	1.37	3.533	2.19	6.600	9.86	9.67	1.92
0.500	1.37	3.567	2.19	6.633	9.86	9.70	1.92
0.533	1.37	3.600	2.19	6.667	9.86	9.73	1.92
0.567	1.37	3.633	2.19	6.700	9.86	9.77	1.92
0.600	1.37	3.667	2.19	6.733	9.86	9.80	1.92
0.633	1.37	3.700	2.19	6.767	7.12	9.83	1.92
0.667	1.37	3.733	2.19	6.800	4.38	9.87	1.92
0.700	1.37	3.767	2.19	6.833	4.38	9.90	1.92
0.733	1.37	3.800	2.19	6.867	4.38	9.93	1.92
0.767	1.37	3.833	2.19	6.900	4.38	9.97	1.92
0.800	1.37	3.867	2.19	6.933	4.38	10.00	1.92
0.833	1.37	3.900	2.19	6.967	4.38	10.03	1.92
0.867	1.37	3.933	2.19	7.000	4.38	10.07	1.92
0.900	1.37	3.967	2.19	7.033	4.38	10.10	1.92
0.933	1.37	4.000	2.19	7.067	4.38	10.13	1.92
0.967	1.37	4.033	2.19	7.100	4.38	10.17	1.92
1.000	1.37	4.067	2.19	7.133	4.38	10.20	1.92
1.033	1.37	4.100	2.19	7.167	4.38	10.23	1.92
1.067	1.37	4.133	2.19	7.200	4.38	10.27	1.51
1.100	1.37	4.167	2.19	7.233	4.38	10.30	1.10
1.133	1.37	4.200	2.19	7.267	3.84	10.33	1.10
1.167	1.37	4.233	2.19	7.300	3.29	10.37	1.10
1.200	1.37	4.267	2.74	7.333	3.29	10.40	1.10
1.233	1.37	4.300	3.29	7.367	3.29	10.43	1.10
1.267	1.37	4.333	3.29	7.400	3.29	10.47	1.10
1.300	1.37	4.367	3.29	7.433	3.29	10.50	1.10
1.333	1.37	4.400	3.29	7.467	3.29	10.53	1.10
1.367	1.37	4.433	3.29	7.500	3.29	10.57	1.10
1.400	1.37	4.467	3.29	7.533	3.29	10.60	1.10
1.433	1.37	4.500	3.29	7.567	3.29	10.63	1.10
1.467	1.37	4.533	3.29	7.600	3.29	10.67	1.10

SCS 12 hr_Exsting Conditions

1.500	1.37	4.567	3.29	7.633	3.29	10.70	1.10
1.533	1.37	4.600	3.29	7.667	3.29	10.73	1.10
1.567	1.37	4.633	3.29	7.700	3.29	10.77	1.10
1.600	1.37	4.667	3.29	7.733	3.29	10.80	1.10
1.633	1.37	4.700	3.29	7.767	3.29	10.83	1.10
1.667	1.37	4.733	3.29	7.800	3.29	10.87	1.10
1.700	1.37	4.767	3.84	7.833	3.29	10.90	1.10
1.733	1.37	4.800	4.38	7.867	3.29	10.93	1.10
1.767	1.37	4.833	4.38	7.900	3.29	10.97	1.10
1.800	1.37	4.867	4.38	7.933	3.29	11.00	1.10
1.833	1.37	4.900	4.38	7.967	3.29	11.03	1.10
1.867	1.37	4.933	4.38	8.000	3.29	11.07	1.10
1.900	1.37	4.967	4.38	8.033	3.29	11.10	1.10
1.933	1.37	5.000	4.38	8.067	3.29	11.13	1.10
1.967	1.37	5.033	4.38	8.100	3.29	11.17	1.10
2.000	1.37	5.067	4.38	8.133	3.29	11.20	1.10
2.033	1.37	5.100	4.38	8.167	3.29	11.23	1.10
2.067	1.37	5.133	4.38	8.200	3.29	11.27	1.10
2.100	1.37	5.167	4.38	8.233	3.29	11.30	1.10
2.133	1.37	5.200	4.38	8.267	2.60	11.33	1.10
2.167	1.37	5.233	4.38	8.300	1.92	11.37	1.10
2.200	1.37	5.267	5.48	8.333	1.92	11.40	1.10
2.233	1.37	5.300	6.57	8.367	1.92	11.43	1.10
2.267	1.51	5.333	6.57	8.400	1.92	11.47	1.10
2.300	1.64	5.367	6.57	8.433	1.92	11.50	1.10
2.333	1.64	5.400	6.57	8.467	1.92	11.53	1.10
2.367	1.64	5.433	6.57	8.500	1.92	11.57	1.10
2.400	1.64	5.467	6.57	8.533	1.92	11.60	1.10
2.433	1.64	5.500	6.57	8.567	1.92	11.63	1.10
2.467	1.64	5.533	6.57	8.600	1.92	11.67	1.10
2.500	1.64	5.567	6.57	8.633	1.92	11.70	1.10
2.533	1.64	5.600	6.57	8.667	1.92	11.73	1.10
2.567	1.64	5.633	6.57	8.700	1.92	11.77	1.10
2.600	1.64	5.667	6.57	8.733	1.92	11.80	1.10
2.633	1.64	5.700	6.57	8.767	1.92	11.83	1.10
2.667	1.64	5.733	6.57	8.800	1.92	11.87	1.10
2.700	1.64	5.767	16.43	8.833	1.92	11.90	1.10
2.733	1.64	5.800	26.30	8.867	1.92	11.93	1.10
2.767	1.64	5.833	26.30	8.900	1.92	11.97	1.10
2.800	1.64	5.867	26.30	8.933	1.92	12.00	1.10
2.833	1.64	5.900	26.30	8.967	1.92	12.03	1.10
2.867	1.64	5.933	26.30	9.000	1.92	12.07	1.10
2.900	1.64	5.967	26.30	9.033	1.92	12.10	1.10
2.933	1.64	6.000	26.30	9.067	1.92	12.13	1.10
2.967	1.64	6.033	72.32	9.100	1.92	12.17	1.10
3.000	1.64	6.067	72.32	9.133	1.92	12.20	1.10
3.033	1.64	6.100	72.32	9.167	1.92	12.23	1.10
3.067	1.64	6.133	72.32	9.200	1.92	12.27	0.55

SCS 12 hr_Exsting Conditions

Max.Eff.Inten.(mm/hr)=	72.32	26.07		
over (min)	5.00	8.00		
Storage Coeff. (min)=	1.33 (ii)	6.28 (ii)		
Unit Hyd. Tpeak (min)=	4.00	8.00		
Unit Hyd. peak (cms)=	0.48	0.16		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.018 (iii)	
TIME TO PEAK (hrs)=	6.23	6.27	6.23	
RUNOFF VOLUME (mm)=	52.79	16.15	44.34	
TOTAL RAINFALL (mm)=	54.79	54.79	54.79	
RUNOFF COEFFICIENT =	0.96	0.29	0.81	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0110)	Area (ha)=	0.71	
ID= 1 DT= 2.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.26	0.45
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	68.80	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.64	6.167	72.32	9.23	1.92
0.067	0.00	3.133	1.64	6.200	72.32	9.27	1.92
0.100	0.00	3.167	1.64	6.233	72.32	9.30	1.92
0.133	0.00	3.200	1.64	6.267	41.10	9.33	1.92
0.167	0.00	3.233	1.64	6.300	9.86	9.37	1.92
0.200	0.00	3.267	1.92	6.333	9.86	9.40	1.92
0.233	0.00	3.300	2.19	6.367	9.86	9.43	1.92
0.267	0.68	3.333	2.19	6.400	9.86	9.47	1.92
0.300	1.37	3.367	2.19	6.433	9.86	9.50	1.92
0.333	1.37	3.400	2.19	6.467	9.86	9.53	1.92

SCS 12 hr_Exsting Conditions

0.367	1.37	3.433	2.19	6.500	9.86	9.57	1.92
0.400	1.37	3.467	2.19	6.533	9.86	9.60	1.92
0.433	1.37	3.500	2.19	6.567	9.86	9.63	1.92
0.467	1.37	3.533	2.19	6.600	9.86	9.67	1.92
0.500	1.37	3.567	2.19	6.633	9.86	9.70	1.92
0.533	1.37	3.600	2.19	6.667	9.86	9.73	1.92
0.567	1.37	3.633	2.19	6.700	9.86	9.77	1.92
0.600	1.37	3.667	2.19	6.733	9.86	9.80	1.92
0.633	1.37	3.700	2.19	6.767	7.12	9.83	1.92
0.667	1.37	3.733	2.19	6.800	4.38	9.87	1.92
0.700	1.37	3.767	2.19	6.833	4.38	9.90	1.92
0.733	1.37	3.800	2.19	6.867	4.38	9.93	1.92
0.767	1.37	3.833	2.19	6.900	4.38	9.97	1.92
0.800	1.37	3.867	2.19	6.933	4.38	10.00	1.92
0.833	1.37	3.900	2.19	6.967	4.38	10.03	1.92
0.867	1.37	3.933	2.19	7.000	4.38	10.07	1.92
0.900	1.37	3.967	2.19	7.033	4.38	10.10	1.92
0.933	1.37	4.000	2.19	7.067	4.38	10.13	1.92
0.967	1.37	4.033	2.19	7.100	4.38	10.17	1.92
1.000	1.37	4.067	2.19	7.133	4.38	10.20	1.92
1.033	1.37	4.100	2.19	7.167	4.38	10.23	1.92
1.067	1.37	4.133	2.19	7.200	4.38	10.27	1.51
1.100	1.37	4.167	2.19	7.233	4.38	10.30	1.10
1.133	1.37	4.200	2.19	7.267	3.84	10.33	1.10
1.167	1.37	4.233	2.19	7.300	3.29	10.37	1.10
1.200	1.37	4.267	2.74	7.333	3.29	10.40	1.10
1.233	1.37	4.300	3.29	7.367	3.29	10.43	1.10
1.267	1.37	4.333	3.29	7.400	3.29	10.47	1.10
1.300	1.37	4.367	3.29	7.433	3.29	10.50	1.10
1.333	1.37	4.400	3.29	7.467	3.29	10.53	1.10
1.367	1.37	4.433	3.29	7.500	3.29	10.57	1.10
1.400	1.37	4.467	3.29	7.533	3.29	10.60	1.10
1.433	1.37	4.500	3.29	7.567	3.29	10.63	1.10
1.467	1.37	4.533	3.29	7.600	3.29	10.67	1.10
1.500	1.37	4.567	3.29	7.633	3.29	10.70	1.10
1.533	1.37	4.600	3.29	7.667	3.29	10.73	1.10
1.567	1.37	4.633	3.29	7.700	3.29	10.77	1.10
1.600	1.37	4.667	3.29	7.733	3.29	10.80	1.10
1.633	1.37	4.700	3.29	7.767	3.29	10.83	1.10
1.667	1.37	4.733	3.29	7.800	3.29	10.87	1.10
1.700	1.37	4.767	3.84	7.833	3.29	10.90	1.10
1.733	1.37	4.800	4.38	7.867	3.29	10.93	1.10
1.767	1.37	4.833	4.38	7.900	3.29	10.97	1.10
1.800	1.37	4.867	4.38	7.933	3.29	11.00	1.10
1.833	1.37	4.900	4.38	7.967	3.29	11.03	1.10
1.867	1.37	4.933	4.38	8.000	3.29	11.07	1.10
1.900	1.37	4.967	4.38	8.033	3.29	11.10	1.10
1.933	1.37	5.000	4.38	8.067	3.29	11.13	1.10
1.967	1.37	5.033	4.38	8.100	3.29	11.17	1.10

2.000	1.37	5.067	4.38	8.133	3.29	11.20	1.10
2.033	1.37	5.100	4.38	8.167	3.29	11.23	1.10
2.067	1.37	5.133	4.38	8.200	3.29	11.27	1.10
2.100	1.37	5.167	4.38	8.233	3.29	11.30	1.10
2.133	1.37	5.200	4.38	8.267	2.60	11.33	1.10
2.167	1.37	5.233	4.38	8.300	1.92	11.37	1.10
2.200	1.37	5.267	5.48	8.333	1.92	11.40	1.10
2.233	1.37	5.300	6.57	8.367	1.92	11.43	1.10
2.267	1.51	5.333	6.57	8.400	1.92	11.47	1.10
2.300	1.64	5.367	6.57	8.433	1.92	11.50	1.10
2.333	1.64	5.400	6.57	8.467	1.92	11.53	1.10
2.367	1.64	5.433	6.57	8.500	1.92	11.57	1.10
2.400	1.64	5.467	6.57	8.533	1.92	11.60	1.10
2.433	1.64	5.500	6.57	8.567	1.92	11.63	1.10
2.467	1.64	5.533	6.57	8.600	1.92	11.67	1.10
2.500	1.64	5.567	6.57	8.633	1.92	11.70	1.10
2.533	1.64	5.600	6.57	8.667	1.92	11.73	1.10
2.567	1.64	5.633	6.57	8.700	1.92	11.77	1.10
2.600	1.64	5.667	6.57	8.733	1.92	11.80	1.10
2.633	1.64	5.700	6.57	8.767	1.92	11.83	1.10
2.667	1.64	5.733	6.57	8.800	1.92	11.87	1.10
2.700	1.64	5.767	16.43	8.833	1.92	11.90	1.10
2.733	1.64	5.800	26.30	8.867	1.92	11.93	1.10
2.767	1.64	5.833	26.30	8.900	1.92	11.97	1.10
2.800	1.64	5.867	26.30	8.933	1.92	12.00	1.10
2.833	1.64	5.900	26.30	8.967	1.92	12.03	1.10
2.867	1.64	5.933	26.30	9.000	1.92	12.07	1.10
2.900	1.64	5.967	26.30	9.033	1.92	12.10	1.10
2.933	1.64	6.000	26.30	9.067	1.92	12.13	1.10
2.967	1.64	6.033	72.32	9.100	1.92	12.17	1.10
3.000	1.64	6.067	72.32	9.133	1.92	12.20	1.10
3.033	1.64	6.100	72.32	9.167	1.92	12.23	1.10
3.067	1.64	6.133	72.32	9.200	1.92	12.27	0.55

Max.Eff.Inten.(mm/hr)=		72.32	24.19	
over (min)		5.00	16.00	
Storage Coeff. (min)=		2.32 (ii)	14.77 (ii)	
Unit Hyd. Tpeak (min)=		4.00	16.00	
Unit Hyd. peak (cms)=		0.38	0.07	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.02	0.063 (iii)
TIME TO PEAK	(hrs)=	6.23	6.40	6.23
RUNOFF VOLUME	(mm)=	52.79	16.15	29.33
TOTAL RAINFALL	(mm)=	54.79	54.79	54.79
RUNOFF COEFFICIENT	=	0.96	0.29	0.54

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.063	6.23	29.33
+ ID2= 2 (0120):		0.11	0.018	6.23	44.34
ID = 3 (0122):		0.82	0.082	6.23	31.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)=	0.31	
ID= 1 DT= 2.0 min	Total Imp(%)=	54.00	Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.64	6.167	72.32	9.23	1.92
0.067	0.00	3.133	1.64	6.200	72.32	9.27	1.92
0.100	0.00	3.167	1.64	6.233	72.32	9.30	1.92
0.133	0.00	3.200	1.64	6.267	41.10	9.33	1.92
0.167	0.00	3.233	1.64	6.300	9.86	9.37	1.92
0.200	0.00	3.267	1.92	6.333	9.86	9.40	1.92
0.233	0.00	3.300	2.19	6.367	9.86	9.43	1.92
0.267	0.68	3.333	2.19	6.400	9.86	9.47	1.92
0.300	1.37	3.367	2.19	6.433	9.86	9.50	1.92
0.333	1.37	3.400	2.19	6.467	9.86	9.53	1.92
0.367	1.37	3.433	2.19	6.500	9.86	9.57	1.92
0.400	1.37	3.467	2.19	6.533	9.86	9.60	1.92
0.433	1.37	3.500	2.19	6.567	9.86	9.63	1.92
0.467	1.37	3.533	2.19	6.600	9.86	9.67	1.92

0.500	1.37	3.567	2.19	6.633	9.86	9.70	1.92
0.533	1.37	3.600	2.19	6.667	9.86	9.73	1.92
0.567	1.37	3.633	2.19	6.700	9.86	9.77	1.92
0.600	1.37	3.667	2.19	6.733	9.86	9.80	1.92
0.633	1.37	3.700	2.19	6.767	7.12	9.83	1.92
0.667	1.37	3.733	2.19	6.800	4.38	9.87	1.92
0.700	1.37	3.767	2.19	6.833	4.38	9.90	1.92
0.733	1.37	3.800	2.19	6.867	4.38	9.93	1.92
0.767	1.37	3.833	2.19	6.900	4.38	9.97	1.92
0.800	1.37	3.867	2.19	6.933	4.38	10.00	1.92
0.833	1.37	3.900	2.19	6.967	4.38	10.03	1.92
0.867	1.37	3.933	2.19	7.000	4.38	10.07	1.92
0.900	1.37	3.967	2.19	7.033	4.38	10.10	1.92
0.933	1.37	4.000	2.19	7.067	4.38	10.13	1.92
0.967	1.37	4.033	2.19	7.100	4.38	10.17	1.92
1.000	1.37	4.067	2.19	7.133	4.38	10.20	1.92
1.033	1.37	4.100	2.19	7.167	4.38	10.23	1.92
1.067	1.37	4.133	2.19	7.200	4.38	10.27	1.51
1.100	1.37	4.167	2.19	7.233	4.38	10.30	1.10
1.133	1.37	4.200	2.19	7.267	3.84	10.33	1.10
1.167	1.37	4.233	2.19	7.300	3.29	10.37	1.10
1.200	1.37	4.267	2.74	7.333	3.29	10.40	1.10
1.233	1.37	4.300	3.29	7.367	3.29	10.43	1.10
1.267	1.37	4.333	3.29	7.400	3.29	10.47	1.10
1.300	1.37	4.367	3.29	7.433	3.29	10.50	1.10
1.333	1.37	4.400	3.29	7.467	3.29	10.53	1.10
1.367	1.37	4.433	3.29	7.500	3.29	10.57	1.10
1.400	1.37	4.467	3.29	7.533	3.29	10.60	1.10
1.433	1.37	4.500	3.29	7.567	3.29	10.63	1.10
1.467	1.37	4.533	3.29	7.600	3.29	10.67	1.10
1.500	1.37	4.567	3.29	7.633	3.29	10.70	1.10
1.533	1.37	4.600	3.29	7.667	3.29	10.73	1.10
1.567	1.37	4.633	3.29	7.700	3.29	10.77	1.10
1.600	1.37	4.667	3.29	7.733	3.29	10.80	1.10
1.633	1.37	4.700	3.29	7.767	3.29	10.83	1.10
1.667	1.37	4.733	3.29	7.800	3.29	10.87	1.10
1.700	1.37	4.767	3.84	7.833	3.29	10.90	1.10
1.733	1.37	4.800	4.38	7.867	3.29	10.93	1.10
1.767	1.37	4.833	4.38	7.900	3.29	10.97	1.10
1.800	1.37	4.867	4.38	7.933	3.29	11.00	1.10
1.833	1.37	4.900	4.38	7.967	3.29	11.03	1.10
1.867	1.37	4.933	4.38	8.000	3.29	11.07	1.10
1.900	1.37	4.967	4.38	8.033	3.29	11.10	1.10
1.933	1.37	5.000	4.38	8.067	3.29	11.13	1.10
1.967	1.37	5.033	4.38	8.100	3.29	11.17	1.10
2.000	1.37	5.067	4.38	8.133	3.29	11.20	1.10
2.033	1.37	5.100	4.38	8.167	3.29	11.23	1.10
2.067	1.37	5.133	4.38	8.200	3.29	11.27	1.10
2.100	1.37	5.167	4.38	8.233	3.29	11.30	1.10

2.133	1.37	5.200	4.38	8.267	2.60	11.33	1.10
2.167	1.37	5.233	4.38	8.300	1.92	11.37	1.10
2.200	1.37	5.267	5.48	8.333	1.92	11.40	1.10
2.233	1.37	5.300	6.57	8.367	1.92	11.43	1.10
2.267	1.51	5.333	6.57	8.400	1.92	11.47	1.10
2.300	1.64	5.367	6.57	8.433	1.92	11.50	1.10
2.333	1.64	5.400	6.57	8.467	1.92	11.53	1.10
2.367	1.64	5.433	6.57	8.500	1.92	11.57	1.10
2.400	1.64	5.467	6.57	8.533	1.92	11.60	1.10
2.433	1.64	5.500	6.57	8.567	1.92	11.63	1.10
2.467	1.64	5.533	6.57	8.600	1.92	11.67	1.10
2.500	1.64	5.567	6.57	8.633	1.92	11.70	1.10
2.533	1.64	5.600	6.57	8.667	1.92	11.73	1.10
2.567	1.64	5.633	6.57	8.700	1.92	11.77	1.10
2.600	1.64	5.667	6.57	8.733	1.92	11.80	1.10
2.633	1.64	5.700	6.57	8.767	1.92	11.83	1.10
2.667	1.64	5.733	6.57	8.800	1.92	11.87	1.10
2.700	1.64	5.767	16.43	8.833	1.92	11.90	1.10
2.733	1.64	5.800	26.30	8.867	1.92	11.93	1.10
2.767	1.64	5.833	26.30	8.900	1.92	11.97	1.10
2.800	1.64	5.867	26.30	8.933	1.92	12.00	1.10
2.833	1.64	5.900	26.30	8.967	1.92	12.03	1.10
2.867	1.64	5.933	26.30	9.000	1.92	12.07	1.10
2.900	1.64	5.967	26.30	9.033	1.92	12.10	1.10
2.933	1.64	6.000	26.30	9.067	1.92	12.13	1.10
2.967	1.64	6.033	72.32	9.100	1.92	12.17	1.10
3.000	1.64	6.067	72.32	9.133	1.92	12.20	1.10
3.033	1.64	6.100	72.32	9.167	1.92	12.23	1.10
3.067	1.64	6.133	72.32	9.200	1.92	12.27	0.55

Max.Eff.Inten.(mm/hr)=		72.32	16.82	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.81 (ii)	9.35 (ii)	
Unit Hyd. Tpeak (min)=		4.00	10.00	
Unit Hyd. peak (cms)=		0.43	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.038 (iii)
TIME TO PEAK	(hrs)=	6.23	6.33	6.23
RUNOFF VOLUME	(mm)=	52.79	10.61	33.37
TOTAL RAINFALL	(mm)=	54.79	54.79	54.79
RUNOFF COEFFICIENT	=	0.96	0.19	0.61

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB							
STANDHYD (0160)	Area (ha)= 0.34						
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00	Dir. Conn.(%)= 72.00					

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.64	6.167	72.32	9.23	1.92
0.067	0.00	3.133	1.64	6.200	72.32	9.27	1.92
0.100	0.00	3.167	1.64	6.233	72.32	9.30	1.92
0.133	0.00	3.200	1.64	6.267	41.10	9.33	1.92
0.167	0.00	3.233	1.64	6.300	9.86	9.37	1.92
0.200	0.00	3.267	1.92	6.333	9.86	9.40	1.92
0.233	0.00	3.300	2.19	6.367	9.86	9.43	1.92
0.267	0.68	3.333	2.19	6.400	9.86	9.47	1.92
0.300	1.37	3.367	2.19	6.433	9.86	9.50	1.92
0.333	1.37	3.400	2.19	6.467	9.86	9.53	1.92
0.367	1.37	3.433	2.19	6.500	9.86	9.57	1.92
0.400	1.37	3.467	2.19	6.533	9.86	9.60	1.92
0.433	1.37	3.500	2.19	6.567	9.86	9.63	1.92
0.467	1.37	3.533	2.19	6.600	9.86	9.67	1.92
0.500	1.37	3.567	2.19	6.633	9.86	9.70	1.92
0.533	1.37	3.600	2.19	6.667	9.86	9.73	1.92
0.567	1.37	3.633	2.19	6.700	9.86	9.77	1.92
0.600	1.37	3.667	2.19	6.733	9.86	9.80	1.92
0.633	1.37	3.700	2.19	6.767	7.12	9.83	1.92
0.667	1.37	3.733	2.19	6.800	4.38	9.87	1.92
0.700	1.37	3.767	2.19	6.833	4.38	9.90	1.92
0.733	1.37	3.800	2.19	6.867	4.38	9.93	1.92
0.767	1.37	3.833	2.19	6.900	4.38	9.97	1.92
0.800	1.37	3.867	2.19	6.933	4.38	10.00	1.92
0.833	1.37	3.900	2.19	6.967	4.38	10.03	1.92
0.867	1.37	3.933	2.19	7.000	4.38	10.07	1.92
0.900	1.37	3.967	2.19	7.033	4.38	10.10	1.92
0.933	1.37	4.000	2.19	7.067	4.38	10.13	1.92
0.967	1.37	4.033	2.19	7.100	4.38	10.17	1.92

1.000	1.37	4.067	2.19	7.133	4.38	10.20	1.92
1.033	1.37	4.100	2.19	7.167	4.38	10.23	1.92
1.067	1.37	4.133	2.19	7.200	4.38	10.27	1.51
1.100	1.37	4.167	2.19	7.233	4.38	10.30	1.10
1.133	1.37	4.200	2.19	7.267	3.84	10.33	1.10
1.167	1.37	4.233	2.19	7.300	3.29	10.37	1.10
1.200	1.37	4.267	2.74	7.333	3.29	10.40	1.10
1.233	1.37	4.300	3.29	7.367	3.29	10.43	1.10
1.267	1.37	4.333	3.29	7.400	3.29	10.47	1.10
1.300	1.37	4.367	3.29	7.433	3.29	10.50	1.10
1.333	1.37	4.400	3.29	7.467	3.29	10.53	1.10
1.367	1.37	4.433	3.29	7.500	3.29	10.57	1.10
1.400	1.37	4.467	3.29	7.533	3.29	10.60	1.10
1.433	1.37	4.500	3.29	7.567	3.29	10.63	1.10
1.467	1.37	4.533	3.29	7.600	3.29	10.67	1.10
1.500	1.37	4.567	3.29	7.633	3.29	10.70	1.10
1.533	1.37	4.600	3.29	7.667	3.29	10.73	1.10
1.567	1.37	4.633	3.29	7.700	3.29	10.77	1.10
1.600	1.37	4.667	3.29	7.733	3.29	10.80	1.10
1.633	1.37	4.700	3.29	7.767	3.29	10.83	1.10
1.667	1.37	4.733	3.29	7.800	3.29	10.87	1.10
1.700	1.37	4.767	3.84	7.833	3.29	10.90	1.10
1.733	1.37	4.800	4.38	7.867	3.29	10.93	1.10
1.767	1.37	4.833	4.38	7.900	3.29	10.97	1.10
1.800	1.37	4.867	4.38	7.933	3.29	11.00	1.10
1.833	1.37	4.900	4.38	7.967	3.29	11.03	1.10
1.867	1.37	4.933	4.38	8.000	3.29	11.07	1.10
1.900	1.37	4.967	4.38	8.033	3.29	11.10	1.10
1.933	1.37	5.000	4.38	8.067	3.29	11.13	1.10
1.967	1.37	5.033	4.38	8.100	3.29	11.17	1.10
2.000	1.37	5.067	4.38	8.133	3.29	11.20	1.10
2.033	1.37	5.100	4.38	8.167	3.29	11.23	1.10
2.067	1.37	5.133	4.38	8.200	3.29	11.27	1.10
2.100	1.37	5.167	4.38	8.233	3.29	11.30	1.10
2.133	1.37	5.200	4.38	8.267	2.60	11.33	1.10
2.167	1.37	5.233	4.38	8.300	1.92	11.37	1.10
2.200	1.37	5.267	5.48	8.333	1.92	11.40	1.10
2.233	1.37	5.300	6.57	8.367	1.92	11.43	1.10
2.267	1.51	5.333	6.57	8.400	1.92	11.47	1.10
2.300	1.64	5.367	6.57	8.433	1.92	11.50	1.10
2.333	1.64	5.400	6.57	8.467	1.92	11.53	1.10
2.367	1.64	5.433	6.57	8.500	1.92	11.57	1.10
2.400	1.64	5.467	6.57	8.533	1.92	11.60	1.10
2.433	1.64	5.500	6.57	8.567	1.92	11.63	1.10
2.467	1.64	5.533	6.57	8.600	1.92	11.67	1.10
2.500	1.64	5.567	6.57	8.633	1.92	11.70	1.10
2.533	1.64	5.600	6.57	8.667	1.92	11.73	1.10
2.567	1.64	5.633	6.57	8.700	1.92	11.77	1.10
2.600	1.64	5.667	6.57	8.733	1.92	11.80	1.10

2.633	1.64	5.700	6.57	8.767	1.92	11.83	1.10
2.667	1.64	5.733	6.57	8.800	1.92	11.87	1.10
2.700	1.64	5.767	16.43	8.833	1.92	11.90	1.10
2.733	1.64	5.800	26.30	8.867	1.92	11.93	1.10
2.767	1.64	5.833	26.30	8.900	1.92	11.97	1.10
2.800	1.64	5.867	26.30	8.933	1.92	12.00	1.10
2.833	1.64	5.900	26.30	8.967	1.92	12.03	1.10
2.867	1.64	5.933	26.30	9.000	1.92	12.07	1.10
2.900	1.64	5.967	26.30	9.033	1.92	12.10	1.10
2.933	1.64	6.000	26.30	9.067	1.92	12.13	1.10
2.967	1.64	6.033	72.32	9.100	1.92	12.17	1.10
3.000	1.64	6.067	72.32	9.133	1.92	12.20	1.10
3.033	1.64	6.100	72.32	9.167	1.92	12.23	1.10
3.067	1.64	6.133	72.32	9.200	1.92	12.27	0.55

Max.Eff.Inten.(mm/hr)=		72.32	16.82	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.86 (ii)	7.37 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.42	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.00	0.052 (iii)
TIME TO PEAK	(hrs)=	6.23	6.30	6.23
RUNOFF VOLUME	(mm)=	52.79	10.61	40.97
TOTAL RAINFALL	(mm)=	54.79	54.79	54.79
RUNOFF COEFFICIENT	=	0.96	0.19	0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):		0.31	0.038	6.23	33.37
+ ID2= 2 (0160):		0.34	0.052	6.23	40.97
ID = 3 (0162):		0.65	0.090	6.23	37.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):		0.82	0.082	6.23	31.34
+ ID2= 2 (0162):		0.65	0.090	6.23	37.34
ID = 3 (0167):		1.47	0.172	6.23	34.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB							
STANDHYD (0140)	Area (ha)= 0.11						
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00					

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	1.64	6.167	72.32	9.23	1.92
0.067	0.00	3.133	1.64	6.200	72.32	9.27	1.92
0.100	0.00	3.167	1.64	6.233	72.32	9.30	1.92
0.133	0.00	3.200	1.64	6.267	41.10	9.33	1.92
0.167	0.00	3.233	1.64	6.300	9.86	9.37	1.92
0.200	0.00	3.267	1.92	6.333	9.86	9.40	1.92
0.233	0.00	3.300	2.19	6.367	9.86	9.43	1.92
0.267	0.68	3.333	2.19	6.400	9.86	9.47	1.92
0.300	1.37	3.367	2.19	6.433	9.86	9.50	1.92
0.333	1.37	3.400	2.19	6.467	9.86	9.53	1.92
0.367	1.37	3.433	2.19	6.500	9.86	9.57	1.92
0.400	1.37	3.467	2.19	6.533	9.86	9.60	1.92
0.433	1.37	3.500	2.19	6.567	9.86	9.63	1.92
0.467	1.37	3.533	2.19	6.600	9.86	9.67	1.92
0.500	1.37	3.567	2.19	6.633	9.86	9.70	1.92
0.533	1.37	3.600	2.19	6.667	9.86	9.73	1.92
0.567	1.37	3.633	2.19	6.700	9.86	9.77	1.92
0.600	1.37	3.667	2.19	6.733	9.86	9.80	1.92
0.633	1.37	3.700	2.19	6.767	7.12	9.83	1.92
0.667	1.37	3.733	2.19	6.800	4.38	9.87	1.92

0.700	1.37	3.767	2.19	6.833	4.38	9.90	1.92
0.733	1.37	3.800	2.19	6.867	4.38	9.93	1.92
0.767	1.37	3.833	2.19	6.900	4.38	9.97	1.92
0.800	1.37	3.867	2.19	6.933	4.38	10.00	1.92
0.833	1.37	3.900	2.19	6.967	4.38	10.03	1.92
0.867	1.37	3.933	2.19	7.000	4.38	10.07	1.92
0.900	1.37	3.967	2.19	7.033	4.38	10.10	1.92
0.933	1.37	4.000	2.19	7.067	4.38	10.13	1.92
0.967	1.37	4.033	2.19	7.100	4.38	10.17	1.92
1.000	1.37	4.067	2.19	7.133	4.38	10.20	1.92
1.033	1.37	4.100	2.19	7.167	4.38	10.23	1.92
1.067	1.37	4.133	2.19	7.200	4.38	10.27	1.51
1.100	1.37	4.167	2.19	7.233	4.38	10.30	1.10
1.133	1.37	4.200	2.19	7.267	3.84	10.33	1.10
1.167	1.37	4.233	2.19	7.300	3.29	10.37	1.10
1.200	1.37	4.267	2.74	7.333	3.29	10.40	1.10
1.233	1.37	4.300	3.29	7.367	3.29	10.43	1.10
1.267	1.37	4.333	3.29	7.400	3.29	10.47	1.10
1.300	1.37	4.367	3.29	7.433	3.29	10.50	1.10
1.333	1.37	4.400	3.29	7.467	3.29	10.53	1.10
1.367	1.37	4.433	3.29	7.500	3.29	10.57	1.10
1.400	1.37	4.467	3.29	7.533	3.29	10.60	1.10
1.433	1.37	4.500	3.29	7.567	3.29	10.63	1.10
1.467	1.37	4.533	3.29	7.600	3.29	10.67	1.10
1.500	1.37	4.567	3.29	7.633	3.29	10.70	1.10
1.533	1.37	4.600	3.29	7.667	3.29	10.73	1.10
1.567	1.37	4.633	3.29	7.700	3.29	10.77	1.10
1.600	1.37	4.667	3.29	7.733	3.29	10.80	1.10
1.633	1.37	4.700	3.29	7.767	3.29	10.83	1.10
1.667	1.37	4.733	3.29	7.800	3.29	10.87	1.10
1.700	1.37	4.767	3.84	7.833	3.29	10.90	1.10
1.733	1.37	4.800	4.38	7.867	3.29	10.93	1.10
1.767	1.37	4.833	4.38	7.900	3.29	10.97	1.10
1.800	1.37	4.867	4.38	7.933	3.29	11.00	1.10
1.833	1.37	4.900	4.38	7.967	3.29	11.03	1.10
1.867	1.37	4.933	4.38	8.000	3.29	11.07	1.10
1.900	1.37	4.967	4.38	8.033	3.29	11.10	1.10
1.933	1.37	5.000	4.38	8.067	3.29	11.13	1.10
1.967	1.37	5.033	4.38	8.100	3.29	11.17	1.10
2.000	1.37	5.067	4.38	8.133	3.29	11.20	1.10
2.033	1.37	5.100	4.38	8.167	3.29	11.23	1.10
2.067	1.37	5.133	4.38	8.200	3.29	11.27	1.10
2.100	1.37	5.167	4.38	8.233	3.29	11.30	1.10
2.133	1.37	5.200	4.38	8.267	2.60	11.33	1.10
2.167	1.37	5.233	4.38	8.300	1.92	11.37	1.10
2.200	1.37	5.267	5.48	8.333	1.92	11.40	1.10
2.233	1.37	5.300	6.57	8.367	1.92	11.43	1.10
2.267	1.51	5.333	6.57	8.400	1.92	11.47	1.10
2.300	1.64	5.367	6.57	8.433	1.92	11.50	1.10

SCS 12 hr_Exsting Conditions

2.333	1.64	5.400	6.57	8.467	1.92	11.53	1.10
2.367	1.64	5.433	6.57	8.500	1.92	11.57	1.10
2.400	1.64	5.467	6.57	8.533	1.92	11.60	1.10
2.433	1.64	5.500	6.57	8.567	1.92	11.63	1.10
2.467	1.64	5.533	6.57	8.600	1.92	11.67	1.10
2.500	1.64	5.567	6.57	8.633	1.92	11.70	1.10
2.533	1.64	5.600	6.57	8.667	1.92	11.73	1.10
2.567	1.64	5.633	6.57	8.700	1.92	11.77	1.10
2.600	1.64	5.667	6.57	8.733	1.92	11.80	1.10
2.633	1.64	5.700	6.57	8.767	1.92	11.83	1.10
2.667	1.64	5.733	6.57	8.800	1.92	11.87	1.10
2.700	1.64	5.767	16.43	8.833	1.92	11.90	1.10
2.733	1.64	5.800	26.30	8.867	1.92	11.93	1.10
2.767	1.64	5.833	26.30	8.900	1.92	11.97	1.10
2.800	1.64	5.867	26.30	8.933	1.92	12.00	1.10
2.833	1.64	5.900	26.30	8.967	1.92	12.03	1.10
2.867	1.64	5.933	26.30	9.000	1.92	12.07	1.10
2.900	1.64	5.967	26.30	9.033	1.92	12.10	1.10
2.933	1.64	6.000	26.30	9.067	1.92	12.13	1.10
2.967	1.64	6.033	72.32	9.100	1.92	12.17	1.10
3.000	1.64	6.067	72.32	9.133	1.92	12.20	1.10
3.033	1.64	6.100	72.32	9.167	1.92	12.23	1.10
3.067	1.64	6.133	72.32	9.200	1.92	12.27	0.55

Max.Eff.Inten.(mm/hr)=		72.32	16.82	
over (min)		5.00	8.00	
Storage Coeff. (min)=		1.33 (ii)	6.39 (ii)	
Unit Hyd. Tpeak (min)=		4.00	8.00	
Unit Hyd. peak (cms)=		0.48	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.018 (iii)
TIME TO PEAK	(hrs)=	6.23	6.30	6.23
RUNOFF VOLUME	(mm)=	52.79	10.61	42.65
TOTAL RAINFALL	(mm)=	54.79	54.79	54.79
RUNOFF COEFFICIENT	=	0.96	0.19	0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

SCS 24 Hr Storm Distribution_Existing Condition

SCS 24 hr_Exsting Conditions

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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\a5
437a9c-a295-471f-83be-fa38678efaf3\sc
  Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\a5
437a9c-a295-471f-83be-fa38678efaf3\sc


DATE: 01-16-2026                          TIME: 04:30:14

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 24hr SCS 100yr                **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\Yuan.Yuan\AppD
```

SCS 24 hr_Exsting Conditions

```
|                  |              ata\Local\Temp\
|                  |              56b3036e-ed23-4339-a443-7ff2161d9767\5cd11814
| Ptotal= 98.20 mm |    Comments: 24hr SCS 100yr
-------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.77	12.50	14.14	18.75	1.77
0.25	1.08	6.50	1.77	12.75	7.27	19.00	1.77
0.50	1.08	6.75	1.77	13.00	7.27	19.25	1.77
0.75	1.08	7.00	1.77	13.25	5.30	19.50	1.77
1.00	1.08	7.25	2.16	13.50	5.30	19.75	1.77
1.25	1.08	7.50	2.16	13.75	4.12	20.00	1.77
1.50	1.08	7.75	2.16	14.00	4.12	20.25	1.18
1.75	1.08	8.00	2.16	14.25	2.95	20.50	1.18
2.00	1.08	8.25	2.55	14.50	2.95	20.75	1.18
2.25	1.28	8.50	2.55	14.75	2.95	21.00	1.18
2.50	1.28	8.75	2.75	15.00	2.95	21.25	1.18
2.75	1.28	9.00	2.75	15.25	2.95	21.50	1.18
3.00	1.28	9.25	3.14	15.50	2.95	21.75	1.18
3.25	1.28	9.50	3.14	15.75	2.95	22.00	1.18
3.50	1.28	9.75	3.54	16.00	2.95	22.25	1.18
3.75	1.28	10.00	3.54	16.25	1.77	22.50	1.18
4.00	1.28	10.25	4.52	16.50	1.77	22.75	1.18
4.25	1.57	10.50	4.52	16.75	1.77	23.00	1.18
4.50	1.57	10.75	6.09	17.00	1.77	23.25	1.18
4.75	1.57	11.00	6.09	17.25	1.77	23.50	1.18
5.00	1.57	11.25	9.43	17.50	1.77	23.75	1.18
5.25	1.57	11.50	9.43	17.75	1.77	24.00	1.18
5.50	1.57	11.75	29.07	18.00	1.77		
5.75	1.57	12.00	120.20	18.25	1.77		
6.00	1.57	12.25	14.14	18.50	1.77		

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| CALIB            |
| STANDHYD (  0120)|   Area     (ha)=   0.11
|ID= 1 DT= 2.0 min |   Total Imp(%)=  77.00   Dir. Conn.(%)=  77.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

```
    NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```

SCS 24 hr_Exsting Conditions

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.57	12.167	120.20	18.23	1.77
0.067	0.00	6.133	1.57	12.200	120.20	18.27	1.77
0.100	0.00	6.167	1.57	12.233	120.20	18.30	1.77
0.133	0.00	6.200	1.57	12.267	67.01	18.33	1.77
0.167	0.00	6.233	1.57	12.300	14.14	18.37	1.77
0.200	0.00	6.267	1.67	12.333	14.14	18.40	1.77
0.233	0.00	6.300	1.77	12.367	14.14	18.43	1.77
0.267	0.54	6.333	1.77	12.400	14.14	18.47	1.77
0.300	1.08	6.367	1.77	12.433	14.14	18.50	1.77
0.333	1.08	6.400	1.77	12.467	14.14	18.53	1.77
0.367	1.08	6.433	1.77	12.500	14.14	18.57	1.77
0.400	1.08	6.467	1.77	12.533	14.14	18.60	1.77
0.433	1.08	6.500	1.77	12.567	14.14	18.63	1.77
0.467	1.08	6.533	1.77	12.600	14.14	18.67	1.77
0.500	1.08	6.567	1.77	12.633	14.14	18.70	1.77
0.533	1.08	6.600	1.77	12.667	14.14	18.73	1.77
0.567	1.08	6.633	1.77	12.700	14.14	18.77	1.77
0.600	1.08	6.667	1.77	12.733	14.14	18.80	1.77
0.633	1.08	6.700	1.77	12.767	10.69	18.83	1.77
0.667	1.08	6.733	1.77	12.800	7.27	18.87	1.77
0.700	1.08	6.767	1.77	12.833	7.27	18.90	1.77
0.733	1.08	6.800	1.77	12.867	7.27	18.93	1.77
0.767	1.08	6.833	1.77	12.900	7.27	18.97	1.77
0.800	1.08	6.867	1.77	12.933	7.27	19.00	1.77
0.833	1.08	6.900	1.77	12.967	7.27	19.03	1.77
0.867	1.08	6.933	1.77	13.000	7.27	19.07	1.77
0.900	1.08	6.967	1.77	13.033	7.27	19.10	1.77
0.933	1.08	7.000	1.77	13.067	7.27	19.13	1.77
0.967	1.08	7.033	1.77	13.100	7.27	19.17	1.77
1.000	1.08	7.067	1.77	13.133	7.27	19.20	1.77
1.033	1.08	7.100	1.77	13.167	7.27	19.23	1.77
1.067	1.08	7.133	1.77	13.200	7.27	19.27	1.77
1.100	1.08	7.167	1.77	13.233	7.27	19.30	1.77
1.133	1.08	7.200	1.77	13.267	6.28	19.33	1.77
1.167	1.08	7.233	1.77	13.300	5.30	19.37	1.77
1.200	1.08	7.267	1.96	13.333	5.30	19.40	1.77
1.233	1.08	7.300	2.16	13.367	5.30	19.43	1.77
1.267	1.08	7.333	2.16	13.400	5.30	19.47	1.77
1.300	1.08	7.367	2.16	13.433	5.30	19.50	1.77
1.333	1.08	7.400	2.16	13.467	5.30	19.53	1.77
1.367	1.08	7.433	2.16	13.500	5.30	19.57	1.77
1.400	1.08	7.467	2.16	13.533	5.30	19.60	1.77
1.433	1.08	7.500	2.16	13.567	5.30	19.63	1.77
1.467	1.08	7.533	2.16	13.600	5.30	19.67	1.77
1.500	1.08	7.567	2.16	13.633	5.30	19.70	1.77
1.533	1.08	7.600	2.16	13.667	5.30	19.73	1.77

SCS 24 hr_Exsting Conditions

1.567	1.08	7.633	2.16	13.700	5.30	19.77	1.77
1.600	1.08	7.667	2.16	13.733	5.30	19.80	1.77
1.633	1.08	7.700	2.16	13.767	4.71	19.83	1.77
1.667	1.08	7.733	2.16	13.800	4.12	19.87	1.77
1.700	1.08	7.767	2.16	13.833	4.12	19.90	1.77
1.733	1.08	7.800	2.16	13.867	4.12	19.93	1.77
1.767	1.08	7.833	2.16	13.900	4.12	19.97	1.77
1.800	1.08	7.867	2.16	13.933	4.12	20.00	1.77
1.833	1.08	7.900	2.16	13.967	4.12	20.03	1.77
1.867	1.08	7.933	2.16	14.000	4.12	20.07	1.77
1.900	1.08	7.967	2.16	14.033	4.12	20.10	1.77
1.933	1.08	8.000	2.16	14.067	4.12	20.13	1.77
1.967	1.08	8.033	2.16	14.100	4.12	20.17	1.77
2.000	1.08	8.067	2.16	14.133	4.12	20.20	1.77
2.033	1.08	8.100	2.16	14.167	4.12	20.23	1.77
2.067	1.08	8.133	2.16	14.200	4.12	20.27	1.47
2.100	1.08	8.167	2.16	14.233	4.12	20.30	1.18
2.133	1.08	8.200	2.16	14.267	3.53	20.33	1.18
2.167	1.08	8.233	2.16	14.300	2.95	20.37	1.18
2.200	1.08	8.267	2.36	14.333	2.95	20.40	1.18
2.233	1.08	8.300	2.55	14.367	2.95	20.43	1.18
2.267	1.18	8.333	2.55	14.400	2.95	20.47	1.18
2.300	1.28	8.367	2.55	14.433	2.95	20.50	1.18
2.333	1.28	8.400	2.55	14.467	2.95	20.53	1.18
2.367	1.28	8.433	2.55	14.500	2.95	20.57	1.18
2.400	1.28	8.467	2.55	14.533	2.95	20.60	1.18
2.433	1.28	8.500	2.55	14.567	2.95	20.63	1.18
2.467	1.28	8.533	2.55	14.600	2.95	20.67	1.18
2.500	1.28	8.567	2.55	14.633	2.95	20.70	1.18
2.533	1.28	8.600	2.55	14.667	2.95	20.73	1.18
2.567	1.28	8.633	2.55	14.700	2.95	20.77	1.18
2.600	1.28	8.667	2.55	14.733	2.95	20.80	1.18
2.633	1.28	8.700	2.55	14.767	2.95	20.83	1.18
2.667	1.28	8.733	2.55	14.800	2.95	20.87	1.18
2.700	1.28	8.767	2.65	14.833	2.95	20.90	1.18
2.733	1.28	8.800	2.75	14.867	2.95	20.93	1.18
2.767	1.28	8.833	2.75	14.900	2.95	20.97	1.18
2.800	1.28	8.867	2.75	14.933	2.95	21.00	1.18
2.833	1.28	8.900	2.75	14.967	2.95	21.03	1.18
2.867	1.28	8.933	2.75	15.000	2.95	21.07	1.18
2.900	1.28	8.967	2.75	15.033	2.95	21.10	1.18
2.933	1.28	9.000	2.75	15.067	2.95	21.13	1.18
2.967	1.28	9.033	2.75	15.100	2.95	21.17	1.18
3.000	1.28	9.067	2.75	15.133	2.95	21.20	1.18
3.033	1.28	9.100	2.75	15.167	2.95	21.23	1.18
3.067	1.28	9.133	2.75	15.200	2.95	21.27	1.18
3.100	1.28	9.167	2.75	15.233	2.95	21.30	1.18
3.133	1.28	9.200	2.75	15.267	2.95	21.33	1.18
3.167	1.28	9.233	2.75	15.300	2.95	21.37	1.18

3.200	1.28	9.267	2.95	15.333	2.95	21.40	1.18
3.233	1.28	9.300	3.14	15.367	2.95	21.43	1.18
3.267	1.28	9.333	3.14	15.400	2.95	21.47	1.18
3.300	1.28	9.367	3.14	15.433	2.95	21.50	1.18
3.333	1.28	9.400	3.14	15.467	2.95	21.53	1.18
3.367	1.28	9.433	3.14	15.500	2.95	21.57	1.18
3.400	1.28	9.467	3.14	15.533	2.95	21.60	1.18
3.433	1.28	9.500	3.14	15.567	2.95	21.63	1.18
3.467	1.28	9.533	3.14	15.600	2.95	21.67	1.18
3.500	1.28	9.567	3.14	15.633	2.95	21.70	1.18
3.533	1.28	9.600	3.14	15.667	2.95	21.73	1.18
3.567	1.28	9.633	3.14	15.700	2.95	21.77	1.18
3.600	1.28	9.667	3.14	15.733	2.95	21.80	1.18
3.633	1.28	9.700	3.14	15.767	2.95	21.83	1.18
3.667	1.28	9.733	3.14	15.800	2.95	21.87	1.18
3.700	1.28	9.767	3.34	15.833	2.95	21.90	1.18
3.733	1.28	9.800	3.54	15.867	2.95	21.93	1.18
3.767	1.28	9.833	3.54	15.900	2.95	21.97	1.18
3.800	1.28	9.867	3.54	15.933	2.95	22.00	1.18
3.833	1.28	9.900	3.54	15.967	2.95	22.03	1.18
3.867	1.28	9.933	3.54	16.000	2.95	22.07	1.18
3.900	1.28	9.967	3.54	16.033	2.95	22.10	1.18
3.933	1.28	10.000	3.54	16.067	2.95	22.13	1.18
3.967	1.28	10.033	3.54	16.100	2.95	22.17	1.18
4.000	1.28	10.067	3.54	16.133	2.95	22.20	1.18
4.033	1.28	10.100	3.54	16.167	2.95	22.23	1.18
4.067	1.28	10.133	3.54	16.200	2.95	22.27	1.18
4.100	1.28	10.167	3.54	16.233	2.95	22.30	1.18
4.133	1.28	10.200	3.54	16.267	2.35	22.33	1.18
4.167	1.28	10.233	3.54	16.300	1.77	22.37	1.18
4.200	1.28	10.267	4.03	16.333	1.77	22.40	1.18
4.233	1.28	10.300	4.52	16.367	1.77	22.43	1.18
4.267	1.42	10.333	4.52	16.400	1.77	22.47	1.18
4.300	1.57	10.367	4.52	16.433	1.77	22.50	1.18
4.333	1.57	10.400	4.52	16.467	1.77	22.53	1.18
4.367	1.57	10.433	4.52	16.500	1.77	22.57	1.18
4.400	1.57	10.467	4.52	16.533	1.77	22.60	1.18
4.433	1.57	10.500	4.52	16.567	1.77	22.63	1.18
4.467	1.57	10.533	4.52	16.600	1.77	22.67	1.18
4.500	1.57	10.567	4.52	16.633	1.77	22.70	1.18
4.533	1.57	10.600	4.52	16.667	1.77	22.73	1.18
4.567	1.57	10.633	4.52	16.700	1.77	22.77	1.18
4.600	1.57	10.667	4.52	16.733	1.77	22.80	1.18
4.633	1.57	10.700	4.52	16.767	1.77	22.83	1.18
4.667	1.57	10.733	4.52	16.800	1.77	22.87	1.18
4.700	1.57	10.767	5.30	16.833	1.77	22.90	1.18
4.733	1.57	10.800	6.09	16.867	1.77	22.93	1.18
4.767	1.57	10.833	6.09	16.900	1.77	22.97	1.18
4.800	1.57	10.867	6.09	16.933	1.77	23.00	1.18

4.833	1.57	10.900	6.09	16.967	1.77	23.03	1.18
4.867	1.57	10.933	6.09	17.000	1.77	23.07	1.18
4.900	1.57	10.967	6.09	17.033	1.77	23.10	1.18
4.933	1.57	11.000	6.09	17.067	1.77	23.13	1.18
4.967	1.57	11.033	6.09	17.100	1.77	23.17	1.18
5.000	1.57	11.067	6.09	17.133	1.77	23.20	1.18
5.033	1.57	11.100	6.09	17.167	1.77	23.23	1.18
5.067	1.57	11.133	6.09	17.200	1.77	23.27	1.18
5.100	1.57	11.167	6.09	17.233	1.77	23.30	1.18
5.133	1.57	11.200	6.09	17.267	1.77	23.33	1.18
5.167	1.57	11.233	6.09	17.300	1.77	23.37	1.18
5.200	1.57	11.267	7.76	17.333	1.77	23.40	1.18
5.233	1.57	11.300	9.43	17.367	1.77	23.43	1.18
5.267	1.57	11.333	9.43	17.400	1.77	23.47	1.18
5.300	1.57	11.367	9.43	17.433	1.77	23.50	1.18
5.333	1.57	11.400	9.43	17.467	1.77	23.53	1.18
5.367	1.57	11.433	9.43	17.500	1.77	23.57	1.18
5.400	1.57	11.467	9.43	17.533	1.77	23.60	1.18
5.433	1.57	11.500	9.43	17.567	1.77	23.63	1.18
5.467	1.57	11.533	9.43	17.600	1.77	23.67	1.18
5.500	1.57	11.567	9.43	17.633	1.77	23.70	1.18
5.533	1.57	11.600	9.43	17.667	1.77	23.73	1.18
5.567	1.57	11.633	9.43	17.700	1.77	23.77	1.18
5.600	1.57	11.667	9.43	17.733	1.77	23.80	1.18
5.633	1.57	11.700	9.43	17.767	1.77	23.83	1.18
5.667	1.57	11.733	9.43	17.800	1.77	23.87	1.18
5.700	1.57	11.767	19.27	17.833	1.77	23.90	1.18
5.733	1.57	11.800	29.07	17.867	1.77	23.93	1.18
5.767	1.57	11.833	29.07	17.900	1.77	23.97	1.18
5.800	1.57	11.867	29.07	17.933	1.77	24.00	1.18
5.833	1.57	11.900	29.07	17.967	1.77	24.03	1.18
5.867	1.57	11.933	29.07	18.000	1.77	24.07	1.18
5.900	1.57	11.967	29.07	18.033	1.77	24.10	1.18
5.933	1.57	12.000	29.20	18.067	1.77	24.13	1.18
5.967	1.57	12.033	120.20	18.100	1.77	24.17	1.18
6.000	1.57	12.067	120.20	18.133	1.77	24.20	1.18
6.033	1.57	12.100	120.20	18.167	1.77	24.23	1.18
6.067	1.57	12.133	120.20	18.200	1.77	24.27	0.59

Max.Eff.Inten.(mm/hr)=		120.20	63.84
over (min)		5.00	6.00
Storage Coeff. (min)=		1.08 (ii)	5.13 (ii)
Unit Hyd. Tpeak (min)=		4.00	6.00
Unit Hyd. peak (cms)=		0.50	0.21
			TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.032 (iii)
TIME TO PEAK	(hrs)=	12.23	12.27	12.23
RUNOFF VOLUME	(mm)=	96.20	44.10	84.20
TOTAL RAINFALL	(mm)=	98.20	98.20	98.20

RUNOFF COEFFICIENT = 0.98 0.45 0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0110)	Area (ha)=	0.71	
ID= 1 DT= 2.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.57	12.167	120.20	18.23	1.77
0.067	0.00	6.133	1.57	12.200	120.20	18.27	1.77
0.100	0.00	6.167	1.57	12.233	120.20	18.30	1.77
0.133	0.00	6.200	1.57	12.267	67.01	18.33	1.77
0.167	0.00	6.233	1.57	12.300	14.14	18.37	1.77
0.200	0.00	6.267	1.67	12.333	14.14	18.40	1.77
0.233	0.00	6.300	1.77	12.367	14.14	18.43	1.77
0.267	0.54	6.333	1.77	12.400	14.14	18.47	1.77
0.300	1.08	6.367	1.77	12.433	14.14	18.50	1.77
0.333	1.08	6.400	1.77	12.467	14.14	18.53	1.77
0.367	1.08	6.433	1.77	12.500	14.14	18.57	1.77
0.400	1.08	6.467	1.77	12.533	14.14	18.60	1.77
0.433	1.08	6.500	1.77	12.567	14.14	18.63	1.77
0.467	1.08	6.533	1.77	12.600	14.14	18.67	1.77
0.500	1.08	6.567	1.77	12.633	14.14	18.70	1.77
0.533	1.08	6.600	1.77	12.667	14.14	18.73	1.77
0.567	1.08	6.633	1.77	12.700	14.14	18.77	1.77
0.600	1.08	6.667	1.77	12.733	14.14	18.80	1.77
0.633	1.08	6.700	1.77	12.767	10.69	18.83	1.77
0.667	1.08	6.733	1.77	12.800	7.27	18.87	1.77

0.700	1.08	6.767	1.77	12.833	7.27	18.90	1.77
0.733	1.08	6.800	1.77	12.867	7.27	18.93	1.77
0.767	1.08	6.833	1.77	12.900	7.27	18.97	1.77
0.800	1.08	6.867	1.77	12.933	7.27	19.00	1.77
0.833	1.08	6.900	1.77	12.967	7.27	19.03	1.77
0.867	1.08	6.933	1.77	13.000	7.27	19.07	1.77
0.900	1.08	6.967	1.77	13.033	7.27	19.10	1.77
0.933	1.08	7.000	1.77	13.067	7.27	19.13	1.77
0.967	1.08	7.033	1.77	13.100	7.27	19.17	1.77
1.000	1.08	7.067	1.77	13.133	7.27	19.20	1.77
1.033	1.08	7.100	1.77	13.167	7.27	19.23	1.77
1.067	1.08	7.133	1.77	13.200	7.27	19.27	1.77
1.100	1.08	7.167	1.77	13.233	7.27	19.30	1.77
1.133	1.08	7.200	1.77	13.267	6.28	19.33	1.77
1.167	1.08	7.233	1.77	13.300	5.30	19.37	1.77
1.200	1.08	7.267	1.96	13.333	5.30	19.40	1.77
1.233	1.08	7.300	2.16	13.367	5.30	19.43	1.77
1.267	1.08	7.333	2.16	13.400	5.30	19.47	1.77
1.300	1.08	7.367	2.16	13.433	5.30	19.50	1.77
1.333	1.08	7.400	2.16	13.467	5.30	19.53	1.77
1.367	1.08	7.433	2.16	13.500	5.30	19.57	1.77
1.400	1.08	7.467	2.16	13.533	5.30	19.60	1.77
1.433	1.08	7.500	2.16	13.567	5.30	19.63	1.77
1.467	1.08	7.533	2.16	13.600	5.30	19.67	1.77
1.500	1.08	7.567	2.16	13.633	5.30	19.70	1.77
1.533	1.08	7.600	2.16	13.667	5.30	19.73	1.77
1.567	1.08	7.633	2.16	13.700	5.30	19.77	1.77
1.600	1.08	7.667	2.16	13.733	5.30	19.80	1.77
1.633	1.08	7.700	2.16	13.767	4.71	19.83	1.77
1.667	1.08	7.733	2.16	13.800	4.12	19.87	1.77
1.700	1.08	7.767	2.16	13.833	4.12	19.90	1.77
1.733	1.08	7.800	2.16	13.867	4.12	19.93	1.77
1.767	1.08	7.833	2.16	13.900	4.12	19.97	1.77
1.800	1.08	7.867	2.16	13.933	4.12	20.00	1.77
1.833	1.08	7.900	2.16	13.967	4.12	20.03	1.77
1.867	1.08	7.933	2.16	14.000	4.12	20.07	1.77
1.900	1.08	7.967	2.16	14.033	4.12	20.10	1.77
1.933	1.08	8.000	2.16	14.067	4.12	20.13	1.77
1.967	1.08	8.033	2.16	14.100	4.12	20.17	1.77
2.000	1.08	8.067	2.16	14.133	4.12	20.20	1.77
2.033	1.08	8.100	2.16	14.167	4.12	20.23	1.77
2.067	1.08	8.133	2.16	14.200	4.12	20.27	1.47
2.100	1.08	8.167	2.16	14.233	4.12	20.30	1.18
2.133	1.08	8.200	2.16	14.267	3.53	20.33	1.18
2.167	1.08	8.233	2.16	14.300	2.95	20.37	1.18
2.200	1.08	8.267	2.36	14.333	2.95	20.40	1.18
2.233	1.08	8.300	2.55	14.367	2.95	20.43	1.18
2.267	1.18	8.333	2.55	14.400	2.95	20.47	1.18
2.300	1.28	8.367	2.55	14.433	2.95	20.50	1.18

2.333	1.28	8.400	2.55	14.467	2.95	20.53	1.18
2.367	1.28	8.433	2.55	14.500	2.95	20.57	1.18
2.400	1.28	8.467	2.55	14.533	2.95	20.60	1.18
2.433	1.28	8.500	2.55	14.567	2.95	20.63	1.18
2.467	1.28	8.533	2.55	14.600	2.95	20.67	1.18
2.500	1.28	8.567	2.55	14.633	2.95	20.70	1.18
2.533	1.28	8.600	2.55	14.667	2.95	20.73	1.18
2.567	1.28	8.633	2.55	14.700	2.95	20.77	1.18
2.600	1.28	8.667	2.55	14.733	2.95	20.80	1.18
2.633	1.28	8.700	2.55	14.767	2.95	20.83	1.18
2.667	1.28	8.733	2.55	14.800	2.95	20.87	1.18
2.700	1.28	8.767	2.65	14.833	2.95	20.90	1.18
2.733	1.28	8.800	2.75	14.867	2.95	20.93	1.18
2.767	1.28	8.833	2.75	14.900	2.95	20.97	1.18
2.800	1.28	8.867	2.75	14.933	2.95	21.00	1.18
2.833	1.28	8.900	2.75	14.967	2.95	21.03	1.18
2.867	1.28	8.933	2.75	15.000	2.95	21.07	1.18
2.900	1.28	8.967	2.75	15.033	2.95	21.10	1.18
2.933	1.28	9.000	2.75	15.067	2.95	21.13	1.18
2.967	1.28	9.033	2.75	15.100	2.95	21.17	1.18
3.000	1.28	9.067	2.75	15.133	2.95	21.20	1.18
3.033	1.28	9.100	2.75	15.167	2.95	21.23	1.18
3.067	1.28	9.133	2.75	15.200	2.95	21.27	1.18
3.100	1.28	9.167	2.75	15.233	2.95	21.30	1.18
3.133	1.28	9.200	2.75	15.267	2.95	21.33	1.18
3.167	1.28	9.233	2.75	15.300	2.95	21.37	1.18
3.200	1.28	9.267	2.95	15.333	2.95	21.40	1.18
3.233	1.28	9.300	3.14	15.367	2.95	21.43	1.18
3.267	1.28	9.333	3.14	15.400	2.95	21.47	1.18
3.300	1.28	9.367	3.14	15.433	2.95	21.50	1.18
3.333	1.28	9.400	3.14	15.467	2.95	21.53	1.18
3.367	1.28	9.433	3.14	15.500	2.95	21.57	1.18
3.400	1.28	9.467	3.14	15.533	2.95	21.60	1.18
3.433	1.28	9.500	3.14	15.567	2.95	21.63	1.18
3.467	1.28	9.533	3.14	15.600	2.95	21.67	1.18
3.500	1.28	9.567	3.14	15.633	2.95	21.70	1.18
3.533	1.28	9.600	3.14	15.667	2.95	21.73	1.18
3.567	1.28	9.633	3.14	15.700	2.95	21.77	1.18
3.600	1.28	9.667	3.14	15.733	2.95	21.80	1.18
3.633	1.28	9.700	3.14	15.767	2.95	21.83	1.18
3.667	1.28	9.733	3.14	15.800	2.95	21.87	1.18
3.700	1.28	9.767	3.34	15.833	2.95	21.90	1.18
3.733	1.28	9.800	3.54	15.867	2.95	21.93	1.18
3.767	1.28	9.833	3.54	15.900	2.95	21.97	1.18
3.800	1.28	9.867	3.54	15.933	2.95	22.00	1.18
3.833	1.28	9.900	3.54	15.967	2.95	22.03	1.18
3.867	1.28	9.933	3.54	16.000	2.95	22.07	1.18
3.900	1.28	9.967	3.54	16.033	2.95	22.10	1.18
3.933	1.28	10.000	3.54	16.067	2.95	22.13	1.18

3.967	1.28	10.033	3.54	16.100	2.95	22.17	1.18
4.000	1.28	10.067	3.54	16.133	2.95	22.20	1.18
4.033	1.28	10.100	3.54	16.167	2.95	22.23	1.18
4.067	1.28	10.133	3.54	16.200	2.95	22.27	1.18
4.100	1.28	10.167	3.54	16.233	2.95	22.30	1.18
4.133	1.28	10.200	3.54	16.267	2.35	22.33	1.18
4.167	1.28	10.233	3.54	16.300	1.77	22.37	1.18
4.200	1.28	10.267	4.03	16.333	1.77	22.40	1.18
4.233	1.28	10.300	4.52	16.367	1.77	22.43	1.18
4.267	1.42	10.333	4.52	16.400	1.77	22.47	1.18
4.300	1.57	10.367	4.52	16.433	1.77	22.50	1.18
4.333	1.57	10.400	4.52	16.467	1.77	22.53	1.18
4.367	1.57	10.433	4.52	16.500	1.77	22.57	1.18
4.400	1.57	10.467	4.52	16.533	1.77	22.60	1.18
4.433	1.57	10.500	4.52	16.567	1.77	22.63	1.18
4.467	1.57	10.533	4.52	16.600	1.77	22.67	1.18
4.500	1.57	10.567	4.52	16.633	1.77	22.70	1.18
4.533	1.57	10.600	4.52	16.667	1.77	22.73	1.18
4.567	1.57	10.633	4.52	16.700	1.77	22.77	1.18
4.600	1.57	10.667	4.52	16.733	1.77	22.80	1.18
4.633	1.57	10.700	4.52	16.767	1.77	22.83	1.18
4.667	1.57	10.733	4.52	16.800	1.77	22.87	1.18
4.700	1.57	10.767	5.30	16.833	1.77	22.90	1.18
4.733	1.57	10.800	6.09	16.867	1.77	22.93	1.18
4.767	1.57	10.833	6.09	16.900	1.77	22.97	1.18
4.800	1.57	10.867	6.09	16.933	1.77	23.00	1.18
4.833	1.57	10.900	6.09	16.967	1.77	23.03	1.18
4.867	1.57	10.933	6.09	17.000	1.77	23.07	1.18
4.900	1.57	10.967	6.09	17.033	1.77	23.10	1.18
4.933	1.57	11.000	6.09	17.067	1.77	23.13	1.18
4.967	1.57	11.033	6.09	17.100	1.77	23.17	1.18
5.000	1.57	11.067	6.09	17.133	1.77	23.20	1.18
5.033	1.57	11.100	6.09	17.167	1.77	23.23	1.18
5.067	1.57	11.133	6.09	17.200	1.77	23.27	1.18
5.100	1.57	11.167	6.09	17.233	1.77	23.30	1.18
5.133	1.57	11.200	6.09	17.267	1.77	23.33	1.18
5.167	1.57	11.233	6.09	17.300	1.77	23.37	1.18
5.200	1.57	11.267	7.76	17.333	1.77	23.40	1.18
5.233	1.57	11.300	9.43	17.367	1.77	23.43	1.18
5.267	1.57	11.333	9.43	17.400	1.77	23.47	1.18
5.300	1.57	11.367	9.43	17.433	1.77	23.50	1.18
5.333	1.57	11.400	9.43	17.467	1.77	23.53	1.18
5.367	1.57	11.433	9.43	17.500	1.77	23.57	1.18
5.400	1.57	11.467	9.43	17.533	1.77	23.60	1.18
5.433	1.57	11.500	9.43	17.567	1.77	23.63	1.18
5.467	1.57	11.533	9.43	17.600	1.77	23.67	1.18
5.500	1.57	11.567	9.43	17.633	1.77	23.70	1.18
5.533	1.57	11.600	9.43	17.667	1.77	23.73	1.18
5.567	1.57	11.633	9.43	17.700	1.77	23.77	1.18

5.600	1.57	11.667	9.43	17.733	1.77	23.80	1.18
5.633	1.57	11.700	9.43	17.767	1.77	23.83	1.18
5.667	1.57	11.733	9.43	17.800	1.77	23.87	1.18
5.700	1.57	11.767	19.27	17.833	1.77	23.90	1.18
5.733	1.57	11.800	29.07	17.867	1.77	23.93	1.18
5.767	1.57	11.833	29.07	17.900	1.77	23.97	1.18
5.800	1.57	11.867	29.07	17.933	1.77	24.00	1.18
5.833	1.57	11.900	29.07	17.967	1.77	24.03	1.18
5.867	1.57	11.933	29.07	18.000	1.77	24.07	1.18
5.900	1.57	11.967	29.07	18.033	1.77	24.10	1.18
5.933	1.57	12.000	29.20	18.067	1.77	24.13	1.18
5.967	1.57	12.033	120.20	18.100	1.77	24.17	1.18
6.000	1.57	12.067	120.20	18.133	1.77	24.20	1.18
6.033	1.57	12.100	120.20	18.167	1.77	24.23	1.18
6.067	1.57	12.133	120.20	18.200	1.77	24.27	0.59

Max.Eff.Inten.(mm/hr)=	120.20	63.84		
over (min)	5.00	12.00		
Storage Coeff. (min)=	1.90 (ii)	10.34 (ii)		
Unit Hyd. Tpeak (min)=	4.00	12.00		
Unit Hyd. peak (cms)=	0.42	0.10		
			TOTALS	
PEAK FLOW (cms)=	0.09	0.05	0.129 (iii)	
TIME TO PEAK (hrs)=	12.23	12.33	12.23	
RUNOFF VOLUME (mm)=	96.20	44.10	62.85	
TOTAL RAINFALL (mm)=	98.20	98.20	98.20	
RUNOFF COEFFICIENT =	0.98	0.45	0.64	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):		0.71	0.129	12.23	62.85
+ ID2= 2 (0120):		0.11	0.032	12.23	84.20
ID = 3 (0122):		0.82	0.161	12.23	65.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB / STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.57	12.167	120.20	18.23	1.77
0.067	0.00	6.133	1.57	12.200	120.20	18.27	1.77
0.100	0.00	6.167	1.57	12.233	120.20	18.30	1.77
0.133	0.00	6.200	1.57	12.267	67.01	18.33	1.77
0.167	0.00	6.233	1.57	12.300	14.14	18.37	1.77
0.200	0.00	6.267	1.67	12.333	14.14	18.40	1.77
0.233	0.00	6.300	1.77	12.367	14.14	18.43	1.77
0.267	0.54	6.333	1.77	12.400	14.14	18.47	1.77
0.300	1.08	6.367	1.77	12.433	14.14	18.50	1.77
0.333	1.08	6.400	1.77	12.467	14.14	18.53	1.77
0.367	1.08	6.433	1.77	12.500	14.14	18.57	1.77
0.400	1.08	6.467	1.77	12.533	14.14	18.60	1.77
0.433	1.08	6.500	1.77	12.567	14.14	18.63	1.77
0.467	1.08	6.533	1.77	12.600	14.14	18.67	1.77
0.500	1.08	6.567	1.77	12.633	14.14	18.70	1.77
0.533	1.08	6.600	1.77	12.667	14.14	18.73	1.77
0.567	1.08	6.633	1.77	12.700	14.14	18.77	1.77
0.600	1.08	6.667	1.77	12.733	14.14	18.80	1.77
0.633	1.08	6.700	1.77	12.767	10.69	18.83	1.77
0.667	1.08	6.733	1.77	12.800	7.27	18.87	1.77
0.700	1.08	6.767	1.77	12.833	7.27	18.90	1.77
0.733	1.08	6.800	1.77	12.867	7.27	18.93	1.77
0.767	1.08	6.833	1.77	12.900	7.27	18.97	1.77
0.800	1.08	6.867	1.77	12.933	7.27	19.00	1.77
0.833	1.08	6.900	1.77	12.967	7.27	19.03	1.77
0.867	1.08	6.933	1.77	13.000	7.27	19.07	1.77
0.900	1.08	6.967	1.77	13.033	7.27	19.10	1.77
0.933	1.08	7.000	1.77	13.067	7.27	19.13	1.77
0.967	1.08	7.033	1.77	13.100	7.27	19.17	1.77
1.000	1.08	7.067	1.77	13.133	7.27	19.20	1.77
1.033	1.08	7.100	1.77	13.167	7.27	19.23	1.77

1.067	1.08	7.133	1.77	13.200	7.27	19.27	1.77
1.100	1.08	7.167	1.77	13.233	7.27	19.30	1.77
1.133	1.08	7.200	1.77	13.267	6.28	19.33	1.77
1.167	1.08	7.233	1.77	13.300	5.30	19.37	1.77
1.200	1.08	7.267	1.96	13.333	5.30	19.40	1.77
1.233	1.08	7.300	2.16	13.367	5.30	19.43	1.77
1.267	1.08	7.333	2.16	13.400	5.30	19.47	1.77
1.300	1.08	7.367	2.16	13.433	5.30	19.50	1.77
1.333	1.08	7.400	2.16	13.467	5.30	19.53	1.77
1.367	1.08	7.433	2.16	13.500	5.30	19.57	1.77
1.400	1.08	7.467	2.16	13.533	5.30	19.60	1.77
1.433	1.08	7.500	2.16	13.567	5.30	19.63	1.77
1.467	1.08	7.533	2.16	13.600	5.30	19.67	1.77
1.500	1.08	7.567	2.16	13.633	5.30	19.70	1.77
1.533	1.08	7.600	2.16	13.667	5.30	19.73	1.77
1.567	1.08	7.633	2.16	13.700	5.30	19.77	1.77
1.600	1.08	7.667	2.16	13.733	5.30	19.80	1.77
1.633	1.08	7.700	2.16	13.767	4.71	19.83	1.77
1.667	1.08	7.733	2.16	13.800	4.12	19.87	1.77
1.700	1.08	7.767	2.16	13.833	4.12	19.90	1.77
1.733	1.08	7.800	2.16	13.867	4.12	19.93	1.77
1.767	1.08	7.833	2.16	13.900	4.12	19.97	1.77
1.800	1.08	7.867	2.16	13.933	4.12	20.00	1.77
1.833	1.08	7.900	2.16	13.967	4.12	20.03	1.77
1.867	1.08	7.933	2.16	14.000	4.12	20.07	1.77
1.900	1.08	7.967	2.16	14.033	4.12	20.10	1.77
1.933	1.08	8.000	2.16	14.067	4.12	20.13	1.77
1.967	1.08	8.033	2.16	14.100	4.12	20.17	1.77
2.000	1.08	8.067	2.16	14.133	4.12	20.20	1.77
2.033	1.08	8.100	2.16	14.167	4.12	20.23	1.77
2.067	1.08	8.133	2.16	14.200	4.12	20.27	1.47
2.100	1.08	8.167	2.16	14.233	4.12	20.30	1.18
2.133	1.08	8.200	2.16	14.267	3.53	20.33	1.18
2.167	1.08	8.233	2.16	14.300	2.95	20.37	1.18
2.200	1.08	8.267	2.36	14.333	2.95	20.40	1.18
2.233	1.08	8.300	2.55	14.367	2.95	20.43	1.18
2.267	1.18	8.333	2.55	14.400	2.95	20.47	1.18
2.300	1.28	8.367	2.55	14.433	2.95	20.50	1.18
2.333	1.28	8.400	2.55	14.467	2.95	20.53	1.18
2.367	1.28	8.433	2.55	14.500	2.95	20.57	1.18
2.400	1.28	8.467	2.55	14.533	2.95	20.60	1.18
2.433	1.28	8.500	2.55	14.567	2.95	20.63	1.18
2.467	1.28	8.533	2.55	14.600	2.95	20.67	1.18
2.500	1.28	8.567	2.55	14.633	2.95	20.70	1.18
2.533	1.28	8.600	2.55	14.667	2.95	20.73	1.18
2.567	1.28	8.633	2.55	14.700	2.95	20.77	1.18
2.600	1.28	8.667	2.55	14.733	2.95	20.80	1.18
2.633	1.28	8.700	2.55	14.767	2.95	20.83	1.18
2.667	1.28	8.733	2.55	14.800	2.95	20.87	1.18

2.700	1.28	8.767	2.65	14.833	2.95	20.90	1.18
2.733	1.28	8.800	2.75	14.867	2.95	20.93	1.18
2.767	1.28	8.833	2.75	14.900	2.95	20.97	1.18
2.800	1.28	8.867	2.75	14.933	2.95	21.00	1.18
2.833	1.28	8.900	2.75	14.967	2.95	21.03	1.18
2.867	1.28	8.933	2.75	15.000	2.95	21.07	1.18
2.900	1.28	8.967	2.75	15.033	2.95	21.10	1.18
2.933	1.28	9.000	2.75	15.067	2.95	21.13	1.18
2.967	1.28	9.033	2.75	15.100	2.95	21.17	1.18
3.000	1.28	9.067	2.75	15.133	2.95	21.20	1.18
3.033	1.28	9.100	2.75	15.167	2.95	21.23	1.18
3.067	1.28	9.133	2.75	15.200	2.95	21.27	1.18
3.100	1.28	9.167	2.75	15.233	2.95	21.30	1.18
3.133	1.28	9.200	2.75	15.267	2.95	21.33	1.18
3.167	1.28	9.233	2.75	15.300	2.95	21.37	1.18
3.200	1.28	9.267	2.95	15.333	2.95	21.40	1.18
3.233	1.28	9.300	3.14	15.367	2.95	21.43	1.18
3.267	1.28	9.333	3.14	15.400	2.95	21.47	1.18
3.300	1.28	9.367	3.14	15.433	2.95	21.50	1.18
3.333	1.28	9.400	3.14	15.467	2.95	21.53	1.18
3.367	1.28	9.433	3.14	15.500	2.95	21.57	1.18
3.400	1.28	9.467	3.14	15.533	2.95	21.60	1.18
3.433	1.28	9.500	3.14	15.567	2.95	21.63	1.18
3.467	1.28	9.533	3.14	15.600	2.95	21.67	1.18
3.500	1.28	9.567	3.14	15.633	2.95	21.70	1.18
3.533	1.28	9.600	3.14	15.667	2.95	21.73	1.18
3.567	1.28	9.633	3.14	15.700	2.95	21.77	1.18
3.600	1.28	9.667	3.14	15.733	2.95	21.80	1.18
3.633	1.28	9.700	3.14	15.767	2.95	21.83	1.18
3.667	1.28	9.733	3.14	15.800	2.95	21.87	1.18
3.700	1.28	9.767	3.34	15.833	2.95	21.90	1.18
3.733	1.28	9.800	3.54	15.867	2.95	21.93	1.18
3.767	1.28	9.833	3.54	15.900	2.95	21.97	1.18
3.800	1.28	9.867	3.54	15.933	2.95	22.00	1.18
3.833	1.28	9.900	3.54	15.967	2.95	22.03	1.18
3.867	1.28	9.933	3.54	16.000	2.95	22.07	1.18
3.900	1.28	9.967	3.54	16.033	2.95	22.10	1.18
3.933	1.28	10.000	3.54	16.067	2.95	22.13	1.18
3.967	1.28	10.033	3.54	16.100	2.95	22.17	1.18
4.000	1.28	10.067	3.54	16.133	2.95	22.20	1.18
4.033	1.28	10.100	3.54	16.167	2.95	22.23	1.18
4.067	1.28	10.133	3.54	16.200	2.95	22.27	1.18
4.100	1.28	10.167	3.54	16.233	2.95	22.30	1.18
4.133	1.28	10.200	3.54	16.267	2.35	22.33	1.18
4.167	1.28	10.233	3.54	16.300	1.77	22.37	1.18
4.200	1.28	10.267	4.03	16.333	1.77	22.40	1.18
4.233	1.28	10.300	4.52	16.367	1.77	22.43	1.18
4.267	1.42	10.333	4.52	16.400	1.77	22.47	1.18
4.300	1.57	10.367	4.52	16.433	1.77	22.50	1.18

4.333	1.57	10.400	4.52	16.467	1.77	22.53	1.18
4.367	1.57	10.433	4.52	16.500	1.77	22.57	1.18
4.400	1.57	10.467	4.52	16.533	1.77	22.60	1.18
4.433	1.57	10.500	4.52	16.567	1.77	22.63	1.18
4.467	1.57	10.533	4.52	16.600	1.77	22.67	1.18
4.500	1.57	10.567	4.52	16.633	1.77	22.70	1.18
4.533	1.57	10.600	4.52	16.667	1.77	22.73	1.18
4.567	1.57	10.633	4.52	16.700	1.77	22.77	1.18
4.600	1.57	10.667	4.52	16.733	1.77	22.80	1.18
4.633	1.57	10.700	4.52	16.767	1.77	22.83	1.18
4.667	1.57	10.733	4.52	16.800	1.77	22.87	1.18
4.700	1.57	10.767	5.30	16.833	1.77	22.90	1.18
4.733	1.57	10.800	6.09	16.867	1.77	22.93	1.18
4.767	1.57	10.833	6.09	16.900	1.77	22.97	1.18
4.800	1.57	10.867	6.09	16.933	1.77	23.00	1.18
4.833	1.57	10.900	6.09	16.967	1.77	23.03	1.18
4.867	1.57	10.933	6.09	17.000	1.77	23.07	1.18
4.900	1.57	10.967	6.09	17.033	1.77	23.10	1.18
4.933	1.57	11.000	6.09	17.067	1.77	23.13	1.18
4.967	1.57	11.033	6.09	17.100	1.77	23.17	1.18
5.000	1.57	11.067	6.09	17.133	1.77	23.20	1.18
5.033	1.57	11.100	6.09	17.167	1.77	23.23	1.18
5.067	1.57	11.133	6.09	17.200	1.77	23.27	1.18
5.100	1.57	11.167	6.09	17.233	1.77	23.30	1.18
5.133	1.57	11.200	6.09	17.267	1.77	23.33	1.18
5.167	1.57	11.233	6.09	17.300	1.77	23.37	1.18
5.200	1.57	11.267	7.76	17.333	1.77	23.40	1.18
5.233	1.57	11.300	9.43	17.367	1.77	23.43	1.18
5.267	1.57	11.333	9.43	17.400	1.77	23.47	1.18
5.300	1.57	11.367	9.43	17.433	1.77	23.50	1.18
5.333	1.57	11.400	9.43	17.467	1.77	23.53	1.18
5.367	1.57	11.433	9.43	17.500	1.77	23.57	1.18
5.400	1.57	11.467	9.43	17.533	1.77	23.60	1.18
5.433	1.57	11.500	9.43	17.567	1.77	23.63	1.18
5.467	1.57	11.533	9.43	17.600	1.77	23.67	1.18
5.500	1.57	11.567	9.43	17.633	1.77	23.70	1.18
5.533	1.57	11.600	9.43	17.667	1.77	23.73	1.18
5.567	1.57	11.633	9.43	17.700	1.77	23.77	1.18
5.600	1.57	11.667	9.43	17.733	1.77	23.80	1.18
5.633	1.57	11.700	9.43	17.767	1.77	23.83	1.18
5.667	1.57	11.733	9.43	17.800	1.77	23.87	1.18
5.700	1.57	11.767	19.27	17.833	1.77	23.90	1.18
5.733	1.57	11.800	29.07	17.867	1.77	23.93	1.18
5.767	1.57	11.833	29.07	17.900	1.77	23.97	1.18
5.800	1.57	11.867	29.07	17.933	1.77	24.00	1.18
5.833	1.57	11.900	29.07	17.967	1.77	24.03	1.18
5.867	1.57	11.933	29.07	18.000	1.77	24.07	1.18
5.900	1.57	11.967	29.07	18.033	1.77	24.10	1.18
5.933	1.57	12.000	29.20	18.067	1.77	24.13	1.18

5.967	1.57	12.033	120.20	18.100	1.77	24.17	1.18
6.000	1.57	12.067	120.20	18.133	1.77	24.20	1.18
6.033	1.57	12.100	120.20	18.167	1.77	24.23	1.18
6.067	1.57	12.133	120.20	18.200	1.77	24.27	0.59

Max.Eff.Inten.(mm/hr)=	120.20	44.52	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.48 (ii)	7.63 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.46	0.15	
			TOTALS
PEAK FLOW (cms)=	0.06	0.01	0.069 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	96.20	31.34	66.35
TOTAL RAINFALL (mm)=	98.20	98.20	98.20
RUNOFF COEFFICIENT =	0.98	0.32	0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0160) | Area (ha)= 0.34
ID= 1 DT= 2.0 min | Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.57	12.167	120.20	18.23	1.77
0.067	0.00	6.133	1.57	12.200	120.20	18.27	1.77
0.100	0.00	6.167	1.57	12.233	120.20	18.30	1.77
0.133	0.00	6.200	1.57	12.267	67.01	18.33	1.77
0.167	0.00	6.233	1.57	12.300	14.14	18.37	1.77

SCS 24 hr_Exsting Conditions

0.200	0.00	6.267	1.67	12.333	14.14	18.40	1.77
0.233	0.00	6.300	1.77	12.367	14.14	18.43	1.77
0.267	0.54	6.333	1.77	12.400	14.14	18.47	1.77
0.300	1.08	6.367	1.77	12.433	14.14	18.50	1.77
0.333	1.08	6.400	1.77	12.467	14.14	18.53	1.77
0.367	1.08	6.433	1.77	12.500	14.14	18.57	1.77
0.400	1.08	6.467	1.77	12.533	14.14	18.60	1.77
0.433	1.08	6.500	1.77	12.567	14.14	18.63	1.77
0.467	1.08	6.533	1.77	12.600	14.14	18.67	1.77
0.500	1.08	6.567	1.77	12.633	14.14	18.70	1.77
0.533	1.08	6.600	1.77	12.667	14.14	18.73	1.77
0.567	1.08	6.633	1.77	12.700	14.14	18.77	1.77
0.600	1.08	6.667	1.77	12.733	14.14	18.80	1.77
0.633	1.08	6.700	1.77	12.767	10.69	18.83	1.77
0.667	1.08	6.733	1.77	12.800	7.27	18.87	1.77
0.700	1.08	6.767	1.77	12.833	7.27	18.90	1.77
0.733	1.08	6.800	1.77	12.867	7.27	18.93	1.77
0.767	1.08	6.833	1.77	12.900	7.27	18.97	1.77
0.800	1.08	6.867	1.77	12.933	7.27	19.00	1.77
0.833	1.08	6.900	1.77	12.967	7.27	19.03	1.77
0.867	1.08	6.933	1.77	13.000	7.27	19.07	1.77
0.900	1.08	6.967	1.77	13.033	7.27	19.10	1.77
0.933	1.08	7.000	1.77	13.067	7.27	19.13	1.77
0.967	1.08	7.033	1.77	13.100	7.27	19.17	1.77
1.000	1.08	7.067	1.77	13.133	7.27	19.20	1.77
1.033	1.08	7.100	1.77	13.167	7.27	19.23	1.77
1.067	1.08	7.133	1.77	13.200	7.27	19.27	1.77
1.100	1.08	7.167	1.77	13.233	7.27	19.30	1.77
1.133	1.08	7.200	1.77	13.267	6.28	19.33	1.77
1.167	1.08	7.233	1.77	13.300	5.30	19.37	1.77
1.200	1.08	7.267	1.96	13.333	5.30	19.40	1.77
1.233	1.08	7.300	2.16	13.367	5.30	19.43	1.77
1.267	1.08	7.333	2.16	13.400	5.30	19.47	1.77
1.300	1.08	7.367	2.16	13.433	5.30	19.50	1.77
1.333	1.08	7.400	2.16	13.467	5.30	19.53	1.77
1.367	1.08	7.433	2.16	13.500	5.30	19.57	1.77
1.400	1.08	7.467	2.16	13.533	5.30	19.60	1.77
1.433	1.08	7.500	2.16	13.567	5.30	19.63	1.77
1.467	1.08	7.533	2.16	13.600	5.30	19.67	1.77
1.500	1.08	7.567	2.16	13.633	5.30	19.70	1.77
1.533	1.08	7.600	2.16	13.667	5.30	19.73	1.77
1.567	1.08	7.633	2.16	13.700	5.30	19.77	1.77
1.600	1.08	7.667	2.16	13.733	5.30	19.80	1.77
1.633	1.08	7.700	2.16	13.767	4.71	19.83	1.77
1.667	1.08	7.733	2.16	13.800	4.12	19.87	1.77
1.700	1.08	7.767	2.16	13.833	4.12	19.90	1.77
1.733	1.08	7.800	2.16	13.867	4.12	19.93	1.77
1.767	1.08	7.833	2.16	13.900	4.12	19.97	1.77
1.800	1.08	7.867	2.16	13.933	4.12	20.00	1.77

SCS 24 hr_Exsting Conditions

1.833	1.08	7.900	2.16	13.967	4.12	20.03	1.77
1.867	1.08	7.933	2.16	14.000	4.12	20.07	1.77
1.900	1.08	7.967	2.16	14.033	4.12	20.10	1.77
1.933	1.08	8.000	2.16	14.067	4.12	20.13	1.77
1.967	1.08	8.033	2.16	14.100	4.12	20.17	1.77
2.000	1.08	8.067	2.16	14.133	4.12	20.20	1.77
2.033	1.08	8.100	2.16	14.167	4.12	20.23	1.77
2.067	1.08	8.133	2.16	14.200	4.12	20.27	1.47
2.100	1.08	8.167	2.16	14.233	4.12	20.30	1.18
2.133	1.08	8.200	2.16	14.267	3.53	20.33	1.18
2.167	1.08	8.233	2.16	14.300	2.95	20.37	1.18
2.200	1.08	8.267	2.36	14.333	2.95	20.40	1.18
2.233	1.08	8.300	2.55	14.367	2.95	20.43	1.18
2.267	1.18	8.333	2.55	14.400	2.95	20.47	1.18
2.300	1.28	8.367	2.55	14.433	2.95	20.50	1.18
2.333	1.28	8.400	2.55	14.467	2.95	20.53	1.18
2.367	1.28	8.433	2.55	14.500	2.95	20.57	1.18
2.400	1.28	8.467	2.55	14.533	2.95	20.60	1.18
2.433	1.28	8.500	2.55	14.567	2.95	20.63	1.18
2.467	1.28	8.533	2.55	14.600	2.95	20.67	1.18
2.500	1.28	8.567	2.55	14.633	2.95	20.70	1.18
2.533	1.28	8.600	2.55	14.667	2.95	20.73	1.18
2.567	1.28	8.633	2.55	14.700	2.95	20.77	1.18
2.600	1.28	8.667	2.55	14.733	2.95	20.80	1.18
2.633	1.28	8.700	2.55	14.767	2.95	20.83	1.18
2.667	1.28	8.733	2.55	14.800	2.95	20.87	1.18
2.700	1.28	8.767	2.65	14.833	2.95	20.90	1.18
2.733	1.28	8.800	2.75	14.867	2.95	20.93	1.18
2.767	1.28	8.833	2.75	14.900	2.95	20.97	1.18
2.800	1.28	8.867	2.75	14.933	2.95	21.00	1.18
2.833	1.28	8.900	2.75	14.967	2.95	21.03	1.18
2.867	1.28	8.933	2.75	15.000	2.95	21.07	1.18
2.900	1.28	8.967	2.75	15.033	2.95	21.10	1.18
2.933	1.28	9.000	2.75	15.067	2.95	21.13	1.18
2.967	1.28	9.033	2.75	15.100	2.95	21.17	1.18
3.000	1.28	9.067	2.75	15.133	2.95	21.20	1.18
3.033	1.28	9.100	2.75	15.167	2.95	21.23	1.18
3.067	1.28	9.133	2.75	15.200	2.95	21.27	1.18
3.100	1.28	9.167	2.75	15.233	2.95	21.30	1.18
3.133	1.28	9.200	2.75	15.267	2.95	21.33	1.18
3.167	1.28	9.233	2.75	15.300	2.95	21.37	1.18
3.200	1.28	9.267	2.95	15.333	2.95	21.40	1.18
3.233	1.28	9.300	3.14	15.367	2.95	21.43	1.18
3.267	1.28	9.333	3.14	15.400	2.95	21.47	1.18
3.300	1.28	9.367	3.14	15.433	2.95	21.50	1.18
3.333	1.28	9.400	3.14	15.467	2.95	21.53	1.18
3.367	1.28	9.433	3.14	15.500	2.95	21.57	1.18
3.400	1.28	9.467	3.14	15.533	2.95	21.60	1.18
3.433	1.28	9.500	3.14	15.567	2.95	21.63	1.18

SCS 24 hr_Exsting Conditions

3.467	1.28	9.533	3.14	15.600	2.95	21.67	1.18
3.500	1.28	9.567	3.14	15.633	2.95	21.70	1.18
3.533	1.28	9.600	3.14	15.667	2.95	21.73	1.18
3.567	1.28	9.633	3.14	15.700	2.95	21.77	1.18
3.600	1.28	9.667	3.14	15.733	2.95	21.80	1.18
3.633	1.28	9.700	3.14	15.767	2.95	21.83	1.18
3.667	1.28	9.733	3.14	15.800	2.95	21.87	1.18
3.700	1.28	9.767	3.34	15.833	2.95	21.90	1.18
3.733	1.28	9.800	3.54	15.867	2.95	21.93	1.18
3.767	1.28	9.833	3.54	15.900	2.95	21.97	1.18
3.800	1.28	9.867	3.54	15.933	2.95	22.00	1.18
3.833	1.28	9.900	3.54	15.967	2.95	22.03	1.18
3.867	1.28	9.933	3.54	16.000	2.95	22.07	1.18
3.900	1.28	9.967	3.54	16.033	2.95	22.10	1.18
3.933	1.28	10.000	3.54	16.067	2.95	22.13	1.18
3.967	1.28	10.033	3.54	16.100	2.95	22.17	1.18
4.000	1.28	10.067	3.54	16.133	2.95	22.20	1.18
4.033	1.28	10.100	3.54	16.167	2.95	22.23	1.18
4.067	1.28	10.133	3.54	16.200	2.95	22.27	1.18
4.100	1.28	10.167	3.54	16.233	2.95	22.30	1.18
4.133	1.28	10.200	3.54	16.267	2.35	22.33	1.18
4.167	1.28	10.233	3.54	16.300	1.77	22.37	1.18
4.200	1.28	10.267	4.03	16.333	1.77	22.40	1.18
4.233	1.28	10.300	4.52	16.367	1.77	22.43	1.18
4.267	1.42	10.333	4.52	16.400	1.77	22.47	1.18
4.300	1.57	10.367	4.52	16.433	1.77	22.50	1.18
4.333	1.57	10.400	4.52	16.467	1.77	22.53	1.18
4.367	1.57	10.433	4.52	16.500	1.77	22.57	1.18
4.400	1.57	10.467	4.52	16.533	1.77	22.60	1.18
4.433	1.57	10.500	4.52	16.567	1.77	22.63	1.18
4.467	1.57	10.533	4.52	16.600	1.77	22.67	1.18
4.500	1.57	10.567	4.52	16.633	1.77	22.70	1.18
4.533	1.57	10.600	4.52	16.667	1.77	22.73	1.18
4.567	1.57	10.633	4.52	16.700	1.77	22.77	1.18
4.600	1.57	10.667	4.52	16.733	1.77	22.80	1.18
4.633	1.57	10.700	4.52	16.767	1.77	22.83	1.18
4.667	1.57	10.733	4.52	16.800	1.77	22.87	1.18
4.700	1.57	10.767	5.30	16.833	1.77	22.90	1.18
4.733	1.57	10.800	6.09	16.867	1.77	22.93	1.18
4.767	1.57	10.833	6.09	16.900	1.77	22.97	1.18
4.800	1.57	10.867	6.09	16.933	1.77	23.00	1.18
4.833	1.57	10.900	6.09	16.967	1.77	23.03	1.18
4.867	1.57	10.933	6.09	17.000	1.77	23.07	1.18
4.900	1.57	10.967	6.09	17.033	1.77	23.10	1.18
4.933	1.57	11.000	6.09	17.067	1.77	23.13	1.18
4.967	1.57	11.033	6.09	17.100	1.77	23.17	1.18
5.000	1.57	11.067	6.09	17.133	1.77	23.20	1.18
5.033	1.57	11.100	6.09	17.167	1.77	23.23	1.18
5.067	1.57	11.133	6.09	17.200	1.77	23.27	1.18

SCS 24 hr_Exsting Conditions

5.100	1.57	11.167	6.09	17.233	1.77	23.30	1.18
5.133	1.57	11.200	6.09	17.267	1.77	23.33	1.18
5.167	1.57	11.233	6.09	17.300	1.77	23.37	1.18
5.200	1.57	11.267	7.76	17.333	1.77	23.40	1.18
5.233	1.57	11.300	9.43	17.367	1.77	23.43	1.18
5.267	1.57	11.333	9.43	17.400	1.77	23.47	1.18
5.300	1.57	11.367	9.43	17.433	1.77	23.50	1.18
5.333	1.57	11.400	9.43	17.467	1.77	23.53	1.18
5.367	1.57	11.433	9.43	17.500	1.77	23.57	1.18
5.400	1.57	11.467	9.43	17.533	1.77	23.60	1.18
5.433	1.57	11.500	9.43	17.567	1.77	23.63	1.18
5.467	1.57	11.533	9.43	17.600	1.77	23.67	1.18
5.500	1.57	11.567	9.43	17.633	1.77	23.70	1.18
5.533	1.57	11.600	9.43	17.667	1.77	23.73	1.18
5.567	1.57	11.633	9.43	17.700	1.77	23.77	1.18
5.600	1.57	11.667	9.43	17.733	1.77	23.80	1.18
5.633	1.57	11.700	9.43	17.767	1.77	23.83	1.18
5.667	1.57	11.733	9.43	17.800	1.77	23.87	1.18
5.700	1.57	11.767	19.27	17.833	1.77	23.90	1.18
5.733	1.57	11.800	29.07	17.867	1.77	23.93	1.18
5.767	1.57	11.833	29.07	17.900	1.77	23.97	1.18
5.800	1.57	11.867	29.07	17.933	1.77	24.00	1.18
5.833	1.57	11.900	29.07	17.967	1.77	24.03	1.18
5.867	1.57	11.933	29.07	18.000	1.77	24.07	1.18
5.900	1.57	11.967	29.07	18.033	1.77	24.10	1.18
5.933	1.57	12.000	29.20	18.067	1.77	24.13	1.18
5.967	1.57	12.033	120.20	18.100	1.77	24.17	1.18
6.000	1.57	12.067	120.20	18.133	1.77	24.20	1.18
6.033	1.57	12.100	120.20	18.167	1.77	24.23	1.18
6.067	1.57	12.133	120.20	18.200	1.77	24.27	0.59

Max.Eff.Inten.(mm/hr)=	120.20	44.52	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.52 (ii)	6.01 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.46	0.17	
			TOTALS
PEAK FLOW (cms)=	0.08	0.01	0.091 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	96.20	31.34	78.03
TOTAL RAINFALL (mm)=	98.20	98.20	98.20
RUNOFF COEFFICIENT =	0.98	0.32	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0150):	0.31	0.069	12.23	66.35
	+ ID2= 2 (0160):	0.34	0.091	12.23	78.03
	ID = 3 (0162):	0.65	0.160	12.23	72.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0122):	0.82	0.161	12.23	65.71
	+ ID2= 2 (0162):	0.65	0.160	12.23	72.46
	ID = 3 (0167):	1.47	0.321	12.23	68.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)=	0.11	
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.57	12.167	120.20	18.23	1.77
0.067	0.00	6.133	1.57	12.200	120.20	18.27	1.77
0.100	0.00	6.167	1.57	12.233	120.20	18.30	1.77
0.133	0.00	6.200	1.57	12.267	67.01	18.33	1.77
0.167	0.00	6.233	1.57	12.300	14.14	18.37	1.77
0.200	0.00	6.267	1.67	12.333	14.14	18.40	1.77
0.233	0.00	6.300	1.77	12.367	14.14	18.43	1.77
0.267	0.54	6.333	1.77	12.400	14.14	18.47	1.77
0.300	1.08	6.367	1.77	12.433	14.14	18.50	1.77
0.333	1.08	6.400	1.77	12.467	14.14	18.53	1.77
0.367	1.08	6.433	1.77	12.500	14.14	18.57	1.77
0.400	1.08	6.467	1.77	12.533	14.14	18.60	1.77
0.433	1.08	6.500	1.77	12.567	14.14	18.63	1.77
0.467	1.08	6.533	1.77	12.600	14.14	18.67	1.77
0.500	1.08	6.567	1.77	12.633	14.14	18.70	1.77
0.533	1.08	6.600	1.77	12.667	14.14	18.73	1.77
0.567	1.08	6.633	1.77	12.700	14.14	18.77	1.77
0.600	1.08	6.667	1.77	12.733	14.14	18.80	1.77
0.633	1.08	6.700	1.77	12.767	10.69	18.83	1.77
0.667	1.08	6.733	1.77	12.800	7.27	18.87	1.77
0.700	1.08	6.767	1.77	12.833	7.27	18.90	1.77
0.733	1.08	6.800	1.77	12.867	7.27	18.93	1.77
0.767	1.08	6.833	1.77	12.900	7.27	18.97	1.77
0.800	1.08	6.867	1.77	12.933	7.27	19.00	1.77
0.833	1.08	6.900	1.77	12.967	7.27	19.03	1.77
0.867	1.08	6.933	1.77	13.000	7.27	19.07	1.77
0.900	1.08	6.967	1.77	13.033	7.27	19.10	1.77
0.933	1.08	7.000	1.77	13.067	7.27	19.13	1.77
0.967	1.08	7.033	1.77	13.100	7.27	19.17	1.77
1.000	1.08	7.067	1.77	13.133	7.27	19.20	1.77
1.033	1.08	7.100	1.77	13.167	7.27	19.23	1.77
1.067	1.08	7.133	1.77	13.200	7.27	19.27	1.77
1.100	1.08	7.167	1.77	13.233	7.27	19.30	1.77
1.133	1.08	7.200	1.77	13.267	6.28	19.33	1.77
1.167	1.08	7.233	1.77	13.300	5.30	19.37	1.77
1.200	1.08	7.267	1.96	13.333	5.30	19.40	1.77
1.233	1.08	7.300	2.16	13.367	5.30	19.43	1.77
1.267	1.08	7.333	2.16	13.400	5.30	19.47	1.77
1.300	1.08	7.367	2.16	13.433	5.30	19.50	1.77
1.333	1.08	7.400	2.16	13.467	5.30	19.53	1.77
1.367	1.08	7.433	2.16	13.500	5.30	19.57	1.77
1.400	1.08	7.467	2.16	13.533	5.30	19.60	1.77
1.433	1.08	7.500	2.16	13.567	5.30	19.63	1.77
1.467	1.08	7.533	2.16	13.600	5.30	19.67	1.77
1.500	1.08	7.567	2.16	13.633	5.30	19.70	1.77
1.533	1.08	7.600	2.16	13.667	5.30	19.73	1.77
1.567	1.08	7.633	2.16	13.700	5.30	19.77	1.77
1.600	1.08	7.667	2.16	13.733	5.30	19.80	1.77
1.633	1.08	7.700	2.16	13.767	4.71	19.83	1.77
1.667	1.08	7.733	2.16	13.800	4.12	19.87	1.77
1.700	1.08	7.767	2.16	13.833	4.12	19.90	1.77
1.733	1.08	7.800	2.16	13.867	4.12	19.93	1.77
1.767	1.08	7.833	2.16	13.900	4.12	19.97	1.77
1.800	1.08	7.867	2.16	13.933	4.12	20.00	1.77
1.833	1.08	7.900	2.16	13.967	4.12	20.03	1.77
1.867	1.08	7.933	2.16	14.000	4.12	20.07	1.77
1.900	1.08	7.967	2.16	14.033	4.12	20.10	1.77
1.933	1.08	8.000	2.16	14.067	4.12	20.13	1.77
1.967	1.08	8.033	2.16	14.100	4.12	20.17	1.77
2.000	1.08	8.067	2.16	14.133	4.12	20.20	1.77
2.033	1.08	8.100	2.16	14.167	4.12	20.23	1.77
2.067	1.08	8.133	2.16	14.200	4.12	20.27	1.47
2.100	1.08	8.167	2.16	14.233	4.12	20.30	1.18
2.133	1.08	8.200	2.16	14.267	3.53	20.33	1.18
2.167	1.08	8.233	2.16	14.300	2.95	20.37	1.18
2.200	1.08	8.267	2.36	14.333	2.95	20.40	1.18
2.233	1.08	8.300	2.55	14.367	2.95	20.43	1.18
2.267	1.18	8.333	2.55	14.400	2.95	20.47	1.18
2.300	1.28	8.367	2.55	14.433	2.95	20.50	1.18
2.333	1.28	8.400	2.55	14.467	2.95	20.53	1.18
2.367	1.28	8.433	2.55	14.500	2.95	20.57	1.18
2.400	1.28	8.467	2.55	14.533	2.95	20.60	1.18
2.433	1.28	8.500	2.55	14.567	2.95	20.63	1.18
2.467	1.28	8.533	2.55	14.600	2.95	20.67	1.18
2.500	1.28	8.567	2.55	14.633	2.95	20.70	1.18
2.533	1.28	8.600	2.55	14.667	2.95	20.73	1.18
2.567	1.28	8.633	2.55	14.700	2.95	20.77	1.18
2.600	1.28	8.667	2.55	14.733	2.95	20.80	1.18
2.633	1.28	8.700	2.55	14.767	2.95	20.83	1.18
2.667	1.28	8.733	2.55	14.800	2.95	20.87	1.18
2.700	1.28	8.767	2.65	14.833	2.95	20.90	1.18
2.733	1.28	8.800	2.75	14.867	2.95	20.93	1.18
2.767	1.28	8.833	2.75	14.900	2.95	20.97	1.18
2.800	1.28	8.867	2.75	14.933	2.95	21.00	1.18
2.833	1.28	8.900	2.75	14.967	2.95	21.03	1.18
2.867	1.28	8.933	2.75	15.000	2.95	21.07	1.18
2.900	1.28	8.967	2.75	15.033	2.95	21.10	1.18
2.933	1.28	9.000	2.75	15.067	2.95	21.13	1.18
2.967	1.28	9.033	2.75	15.100	2.95	21.17	1.18
3.000	1.28	9.067	2.75	15.133	2.95	21.20	1.18
3.033	1.28	9.100	2.75	15.167	2.95	21.23	1.18
3.067	1.28	9.133	2.75	15.200	2.95	21.27	1.18
3.100	1.28	9.167	2.75	15.233	2.95	21.30	1.18
3.133	1.28	9.200	2.75	15.267	2.95	21.33	1.18
3.167	1.28	9.233	2.75	15.300	2.95	21.37	1.18
3.200	1.28	9.267	2.95	15.333	2.95	21.40	1.18
3.233	1.28	9.300	3.14	15.367	2.95	21.43	1.18
3.267	1.28	9.333	3.14	15.400	2.95	21.47	1.18
3.300	1.28	9.367	3.14	15.433	2.95	21.50	1.18
3.333	1.28	9.400	3.14	15.467	2.95	21.53	1.18
3.367	1.28	9.433	3.14	15.500	2.95	21.57	1.18
3.400	1.28	9.467	3.14	15.533	2.95	21.60	1.18
3.433	1.28	9.500	3.14	15.567	2.95	21.63	1.18
3.467	1.28	9.533	3.14	15.600	2.95	21.67	1.18
3.500	1.28	9.567	3.14	15.633	2.95	21.70	1.18
3.533	1.28	9.600	3.14	15.667	2.95	21.73	1.18
3.567	1.28	9.633	3.14	15.700	2.95	21.77	1.18
3.600	1.28	9.667	3.14	15.733	2.95	21.80	1.18
3.633	1.28	9.700	3.14	15.767	2.95	21.83	1.18
3.667	1.28	9.733	3.14	15.800	2.95	21.87	1.18
3.700	1.28	9.767	3.34	15.833	2.95	21.90	1.18
3.733	1.28	9.800	3.54	15.867	2.95	21.93	1.18
3.767	1.28	9.833	3.54	15.900	2.95	21.97	1.18
3.800	1.28	9.867	3.54	15.933	2.95	22.00	1.18
3.833	1.28	9.900	3.54	15.967	2.95	22.03	1.18
3.867	1.28	9.933	3.54	16.000	2.95	22.07	1.18
3.900	1.28	9.967	3.54	16.033	2.95	22.10	1.18
3.933	1.28	10.000	3.54	16.067	2.95	22.13	1.18
3.967	1.28	10.033	3.54	16.100	2.95	22.17	1.18
4.000	1.28	10.067	3.54	16.133	2.95	22.20	1.18
4.033	1.28	10.100	3.54	16.167	2.95	22.23	1.18
4.067	1.28	10.133	3.54	16.200	2.95	22.27	1.18
4.100	1.28	10.167	3.54	16.233	2.95	22.30	1.18
4.133	1.28	10.200	3.54	16.267	2.35	22.33	1.18
4.167	1.28	10.233	3.54	16.300	1.77	22.37	1.18
4.200	1.28	10.267	4.03	16.333	1.77	22.40	1.18
4.233	1.28	10.300	4.52	16.367	1.77	22.43	1.18
4.267	1.42	10.333	4.52	16.400	1.77	22.47	1.18
4.300	1.57	10.367	4.52	16.433	1.77	22.50	1.18
4.333	1.57	10.400	4.52	16.467	1.77	22.53	1.18
4.367	1.57	10.433	4.52	16.500	1.77	22.57	1.18
4.400	1.57	10.467	4.52	16.533	1.77	22.60	1.18
4.433	1.57	10.500	4.52	16.567	1.77	22.63	1.18
4.467	1.57	10.533	4.52	16.600	1.77	22.67	1.18
4.500	1.57	10.567	4.52	16.633	1.77	22.70	1.18
4.533	1.57	10.600	4.52	16.667	1.77	22.73	1.18
4.567	1.57	10.633	4.52	16.700	1.77	22.77	1.18
4.600	1.57	10.667	4.52	16.733	1.77	22.80	1.18
4.633	1.57	10.700	4.52	16.767	1.77	22.83	1.18
4.667	1.57	10.733	4.52	16.800	1.77	22.87	1.18
4.700	1.57	10.767	5.30	16.833	1.77	22.90	1.18
4.733	1.57	10.800	6.09	16.867	1.77	22.93	1.18
4.767	1.57	10.833	6.09	16.900	1.77	22.97	1.18
4.800	1.57	10.867	6.09	16.933	1.77	23.00	1.18
4.833	1.57	10.900	6.09	16.967	1.77	23.03	1.18
4.867	1.57	10.933	6.09	17.000	1.77	23.07	1.18
4.900	1.57	10.967	6.09	17.033	1.77	23.10	1.18
4.933	1.57	11.000	6.09	17.067	1.77	23.13	1.18
4.967	1.57	11.033	6.09	17.100	1.77	23.17	1.18
5.000	1.57	11.067	6.09	17.133	1.77	23.20	1.18
5.033	1.57	11.100	6.09	17.167	1.77	23.23	1.18

5.067	1.57	11.133	6.09	17.200	1.77	23.27	1.18
5.100	1.57	11.167	6.09	17.233	1.77	23.30	1.18
5.133	1.57	11.200	6.09	17.267	1.77	23.33	1.18
5.167	1.57	11.233	6.09	17.300	1.77	23.37	1.18
5.200	1.57	11.267	7.76	17.333	1.77	23.40	1.18
5.233	1.57	11.300	9.43	17.367	1.77	23.43	1.18
5.267	1.57	11.333	9.43	17.400	1.77	23.47	1.18
5.300	1.57	11.367	9.43	17.433	1.77	23.50	1.18
5.333	1.57	11.400	9.43	17.467	1.77	23.53	1.18
5.367	1.57	11.433	9.43	17.500	1.77	23.57	1.18
5.400	1.57	11.467	9.43	17.533	1.77	23.60	1.18
5.433	1.57	11.500	9.43	17.567	1.77	23.63	1.18
5.467	1.57	11.533	9.43	17.600	1.77	23.67	1.18
5.500	1.57	11.567	9.43	17.633	1.77	23.70	1.18
5.533	1.57	11.600	9.43	17.667	1.77	23.73	1.18
5.567	1.57	11.633	9.43	17.700	1.77	23.77	1.18
5.600	1.57	11.667	9.43	17.733	1.77	23.80	1.18
5.633	1.57	11.700	9.43	17.767	1.77	23.83	1.18
5.667	1.57	11.733	9.43	17.800	1.77	23.87	1.18
5.700	1.57	11.767	19.27	17.833	1.77	23.90	1.18
5.733	1.57	11.800	29.07	17.867	1.77	23.93	1.18
5.767	1.57	11.833	29.07	17.900	1.77	23.97	1.18
5.800	1.57	11.867	29.07	17.933	1.77	24.00	1.18
5.833	1.57	11.900	29.07	17.967	1.77	24.03	1.18
5.867	1.57	11.933	29.07	18.000	1.77	24.07	1.18
5.900	1.57	11.967	29.07	18.033	1.77	24.10	1.18
5.933	1.57	12.000	29.20	18.067	1.77	24.13	1.18
5.967	1.57	12.033	120.20	18.100	1.77	24.17	1.18
6.000	1.57	12.067	120.20	18.133	1.77	24.20	1.18
6.033	1.57	12.100	120.20	18.167	1.77	24.23	1.18
6.067	1.57	12.133	120.20	18.200	1.77	24.27	0.59

Max.Eff.Inten.(mm/hr)=	120.20	44.52	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.08 (ii)	5.22 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.21	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.031 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	96.20	31.34	80.62
TOTAL RAINFALL (mm)=	98.20	98.20	98.20
RUNOFF COEFFICIENT =	0.98	0.32	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

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V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\60b894ef-7b43-48ce-ac44-1882ccf5630b\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\60b894ef-7b43-48ce-ac44-1882ccf5630b\sc

DATE: 01-16-2026 TIME: 04:30:13

USER:

COMMENTS: _____

****
** SIMULATION : 24hr SCS 10yr **
****

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\56b3036e-ed23-4339-a443-7ff2161d9767\3ac7c1c1
Ptotal= 69.19 mm	Comments: 24hr SCS 10yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.25	12.50	9.96	18.75	1.25
0.25	0.76	6.50	1.25	12.75	5.12	19.00	1.25
0.50	0.76	6.75	1.25	13.00	5.12	19.25	1.25
0.75	0.76	7.00	1.25	13.25	3.74	19.50	1.25
1.00	0.76	7.25	1.52	13.50	3.74	19.75	1.25
1.25	0.76	7.50	1.52	13.75	2.91	20.00	1.25
1.50	0.76	7.75	1.52	14.00	2.91	20.25	0.83
1.75	0.76	8.00	1.52	14.25	2.08	20.50	0.83
2.00	0.76	8.25	1.80	14.50	2.08	20.75	0.83
2.25	0.90	8.50	1.80	14.75	2.08	21.00	0.83
2.50	0.90	8.75	1.94	15.00	2.08	21.25	0.83
2.75	0.90	9.00	1.94	15.25	2.08	21.50	0.83
3.00	0.90	9.25	2.21	15.50	2.08	21.75	0.83
3.25	0.90	9.50	2.21	15.75	2.08	22.00	0.83
3.50	0.90	9.75	2.49	16.00	2.08	22.25	0.83
3.75	0.90	10.00	2.49	16.25	1.25	22.50	0.83
4.00	0.90	10.25	3.18	16.50	1.25	22.75	0.83
4.25	1.11	10.50	3.18	16.75	1.25	23.00	0.83
4.50	1.11	10.75	4.29	17.00	1.25	23.25	0.83
4.75	1.11	11.00	4.29	17.25	1.25	23.50	0.83
5.00	1.11	11.25	6.64	17.50	1.25	23.75	0.83
5.25	1.11	11.50	6.64	17.75	1.25	24.00	0.83
5.50	1.11	11.75	20.48	18.00	1.25		
5.75	1.11	12.00	84.69	18.25	1.25		
6.00	1.11	12.25	9.96	18.50	1.25		

CALIB	
STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

	IMPERVIOUS	PERVIOUS (i)

Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.11	12.167	84.69	18.23	1.25
0.067	0.00	6.133	1.11	12.200	84.69	18.27	1.25
0.100	0.00	6.167	1.11	12.233	84.69	18.30	1.25
0.133	0.00	6.200	1.11	12.267	47.21	18.33	1.25
0.167	0.00	6.233	1.11	12.300	9.96	18.37	1.25
0.200	0.00	6.267	1.18	12.333	9.96	18.40	1.25
0.233	0.00	6.300	1.25	12.367	9.96	18.43	1.25
0.267	0.38	6.333	1.25	12.400	9.96	18.47	1.25
0.300	0.76	6.367	1.25	12.433	9.96	18.50	1.25
0.333	0.76	6.400	1.25	12.467	9.96	18.53	1.25
0.367	0.76	6.433	1.25	12.500	9.96	18.57	1.25
0.400	0.76	6.467	1.25	12.533	9.96	18.60	1.25
0.433	0.76	6.500	1.25	12.567	9.96	18.63	1.25
0.467	0.76	6.533	1.25	12.600	9.96	18.67	1.25
0.500	0.76	6.567	1.25	12.633	9.96	18.70	1.25
0.533	0.76	6.600	1.25	12.667	9.96	18.73	1.25
0.567	0.76	6.633	1.25	12.700	9.96	18.77	1.25
0.600	0.76	6.667	1.25	12.733	9.96	18.80	1.25
0.633	0.76	6.700	1.25	12.767	7.53	18.83	1.25
0.667	0.76	6.733	1.25	12.800	5.12	18.87	1.25
0.700	0.76	6.767	1.25	12.833	5.12	18.90	1.25
0.733	0.76	6.800	1.25	12.867	5.12	18.93	1.25
0.767	0.76	6.833	1.25	12.900	5.12	18.97	1.25
0.800	0.76	6.867	1.25	12.933	5.12	19.00	1.25
0.833	0.76	6.900	1.25	12.967	5.12	19.03	1.25
0.867	0.76	6.933	1.25	13.000	5.12	19.07	1.25
0.900	0.76	6.967	1.25	13.033	5.12	19.10	1.25
0.933	0.76	7.000	1.25	13.067	5.12	19.13	1.25
0.967	0.76	7.033	1.25	13.100	5.12	19.17	1.25
1.000	0.76	7.067	1.25	13.133	5.12	19.20	1.25
1.033	0.76	7.100	1.25	13.167	5.12	19.23	1.25
1.067	0.76	7.133	1.25	13.200	5.12	19.27	1.25
1.100	0.76	7.167	1.25	13.233	5.12	19.30	1.25
1.133	0.76	7.200	1.25	13.267	4.43	19.33	1.25
1.167	0.76	7.233	1.25	13.300	3.74	19.37	1.25
1.200	0.76	7.267	1.38	13.333	3.74	19.40	1.25
1.233	0.76	7.300	1.52	13.367	3.74	19.43	1.25

1.267	0.76	7.333	1.52	13.400	3.74	19.47	1.25
1.300	0.76	7.367	1.52	13.433	3.74	19.50	1.25
1.333	0.76	7.400	1.52	13.467	3.74	19.53	1.25
1.367	0.76	7.433	1.52	13.500	3.74	19.57	1.25
1.400	0.76	7.467	1.52	13.533	3.74	19.60	1.25
1.433	0.76	7.500	1.52	13.567	3.74	19.63	1.25
1.467	0.76	7.533	1.52	13.600	3.74	19.67	1.25
1.500	0.76	7.567	1.52	13.633	3.74	19.70	1.25
1.533	0.76	7.600	1.52	13.667	3.74	19.73	1.25
1.567	0.76	7.633	1.52	13.700	3.74	19.77	1.25
1.600	0.76	7.667	1.52	13.733	3.74	19.80	1.25
1.633	0.76	7.700	1.52	13.767	3.32	19.83	1.25
1.667	0.76	7.733	1.52	13.800	2.91	19.87	1.25
1.700	0.76	7.767	1.52	13.833	2.91	19.90	1.25
1.733	0.76	7.800	1.52	13.867	2.91	19.93	1.25
1.767	0.76	7.833	1.52	13.900	2.91	19.97	1.25
1.800	0.76	7.867	1.52	13.933	2.91	20.00	1.25
1.833	0.76	7.900	1.52	13.967	2.91	20.03	1.25
1.867	0.76	7.933	1.52	14.000	2.91	20.07	1.25
1.900	0.76	7.967	1.52	14.033	2.91	20.10	1.25
1.933	0.76	8.000	1.52	14.067	2.91	20.13	1.25
1.967	0.76	8.033	1.52	14.100	2.91	20.17	1.25
2.000	0.76	8.067	1.52	14.133	2.91	20.20	1.25
2.033	0.76	8.100	1.52	14.167	2.91	20.23	1.25
2.067	0.76	8.133	1.52	14.200	2.91	20.27	1.04
2.100	0.76	8.167	1.52	14.233	2.91	20.30	0.83
2.133	0.76	8.200	1.52	14.267	2.49	20.33	0.83
2.167	0.76	8.233	1.52	14.300	2.08	20.37	0.83
2.200	0.76	8.267	1.66	14.333	2.08	20.40	0.83
2.233	0.76	8.300	1.80	14.367	2.08	20.43	0.83
2.267	0.83	8.333	1.80	14.400	2.08	20.47	0.83
2.300	0.90	8.367	1.80	14.433	2.08	20.50	0.83
2.333	0.90	8.400	1.80	14.467	2.08	20.53	0.83
2.367	0.90	8.433	1.80	14.500	2.08	20.57	0.83
2.400	0.90	8.467	1.80	14.533	2.08	20.60	0.83
2.433	0.90	8.500	1.80	14.567	2.08	20.63	0.83
2.467	0.90	8.533	1.80	14.600	2.08	20.67	0.83
2.500	0.90	8.567	1.80	14.633	2.08	20.70	0.83
2.533	0.90	8.600	1.80	14.667	2.08	20.73	0.83
2.567	0.90	8.633	1.80	14.700	2.08	20.77	0.83
2.600	0.90	8.667	1.80	14.733	2.08	20.80	0.83
2.633	0.90	8.700	1.80	14.767	2.08	20.83	0.83
2.667	0.90	8.733	1.80	14.800	2.08	20.87	0.83
2.700	0.90	8.767	1.87	14.833	2.08	20.90	0.83
2.733	0.90	8.800	1.94	14.867	2.08	20.93	0.83
2.767	0.90	8.833	1.94	14.900	2.08	20.97	0.83
2.800	0.90	8.867	1.94	14.933	2.08	21.00	0.83
2.833	0.90	8.900	1.94	14.967	2.08	21.03	0.83
2.867	0.90	8.933	1.94	15.000	2.08	21.07	0.83

2.900	0.90	8.967	1.94	15.033	2.08	21.10	0.83
2.933	0.90	9.000	1.94	15.067	2.08	21.13	0.83
2.967	0.90	9.033	1.94	15.100	2.08	21.17	0.83
3.000	0.90	9.067	1.94	15.133	2.08	21.20	0.83
3.033	0.90	9.100	1.94	15.167	2.08	21.23	0.83
3.067	0.90	9.133	1.94	15.200	2.08	21.27	0.83
3.100	0.90	9.167	1.94	15.233	2.08	21.30	0.83
3.133	0.90	9.200	1.94	15.267	2.08	21.33	0.83
3.167	0.90	9.233	1.94	15.300	2.08	21.37	0.83
3.200	0.90	9.267	2.08	15.333	2.08	21.40	0.83
3.233	0.90	9.300	2.21	15.367	2.08	21.43	0.83
3.267	0.90	9.333	2.21	15.400	2.08	21.47	0.83
3.300	0.90	9.367	2.21	15.433	2.08	21.50	0.83
3.333	0.90	9.400	2.21	15.467	2.08	21.53	0.83
3.367	0.90	9.433	2.21	15.500	2.08	21.57	0.83
3.400	0.90	9.467	2.21	15.533	2.08	21.60	0.83
3.433	0.90	9.500	2.21	15.567	2.08	21.63	0.83
3.467	0.90	9.533	2.21	15.600	2.08	21.67	0.83
3.500	0.90	9.567	2.21	15.633	2.08	21.70	0.83
3.533	0.90	9.600	2.21	15.667	2.08	21.73	0.83
3.567	0.90	9.633	2.21	15.700	2.08	21.77	0.83
3.600	0.90	9.667	2.21	15.733	2.08	21.80	0.83
3.633	0.90	9.700	2.21	15.767	2.08	21.83	0.83
3.667	0.90	9.733	2.21	15.800	2.08	21.87	0.83
3.700	0.90	9.767	2.35	15.833	2.08	21.90	0.83
3.733	0.90	9.800	2.49	15.867	2.08	21.93	0.83
3.767	0.90	9.833	2.49	15.900	2.08	21.97	0.83
3.800	0.90	9.867	2.49	15.933	2.08	22.00	0.83
3.833	0.90	9.900	2.49	15.967	2.08	22.03	0.83
3.867	0.90	9.933	2.49	16.000	2.08	22.07	0.83
3.900	0.90	9.967	2.49	16.033	2.08	22.10	0.83
3.933	0.90	10.000	2.49	16.067	2.08	22.13	0.83
3.967	0.90	10.033	2.49	16.100	2.08	22.17	0.83
4.000	0.90	10.067	2.49	16.133	2.08	22.20	0.83
4.033	0.90	10.100	2.49	16.167	2.08	22.23	0.83
4.067	0.90	10.133	2.49	16.200	2.08	22.27	0.83
4.100	0.90	10.167	2.49	16.233	2.08	22.30	0.83
4.133	0.90	10.200	2.49	16.267	1.66	22.33	0.83
4.167	0.90	10.233	2.49	16.300	1.25	22.37	0.83
4.200	0.90	10.267	2.84	16.333	1.25	22.40	0.83
4.233	0.90	10.300	3.18	16.367	1.25	22.43	0.83
4.267	1.00	10.333	3.18	16.400	1.25	22.47	0.83
4.300	1.11	10.367	3.18	16.433	1.25	22.50	0.83
4.333	1.11	10.400	3.18	16.467	1.25	22.53	0.83
4.367	1.11	10.433	3.18	16.500	1.25	22.57	0.83
4.400	1.11	10.467	3.18	16.533	1.25	22.60	0.83
4.433	1.11	10.500	3.18	16.567	1.25	22.63	0.83
4.467	1.11	10.533	3.18	16.600	1.25	22.67	0.83
4.500	1.11	10.567	3.18	16.633	1.25	22.70	0.83

4.533	1.11	10.600	3.18	16.667	1.25	22.73	0.83
4.567	1.11	10.633	3.18	16.700	1.25	22.77	0.83
4.600	1.11	10.667	3.18	16.733	1.25	22.80	0.83
4.633	1.11	10.700	3.18	16.767	1.25	22.83	0.83
4.667	1.11	10.733	3.18	16.800	1.25	22.87	0.83
4.700	1.11	10.767	3.74	16.833	1.25	22.90	0.83
4.733	1.11	10.800	4.29	16.867	1.25	22.93	0.83
4.767	1.11	10.833	4.29	16.900	1.25	22.97	0.83
4.800	1.11	10.867	4.29	16.933	1.25	23.00	0.83
4.833	1.11	10.900	4.29	16.967	1.25	23.03	0.83
4.867	1.11	10.933	4.29	17.000	1.25	23.07	0.83
4.900	1.11	10.967	4.29	17.033	1.25	23.10	0.83
4.933	1.11	11.000	4.29	17.067	1.25	23.13	0.83
4.967	1.11	11.033	4.29	17.100	1.25	23.17	0.83
5.000	1.11	11.067	4.29	17.133	1.25	23.20	0.83
5.033	1.11	11.100	4.29	17.167	1.25	23.23	0.83
5.067	1.11	11.133	4.29	17.200	1.25	23.27	0.83
5.100	1.11	11.167	4.29	17.233	1.25	23.30	0.83
5.133	1.11	11.200	4.29	17.267	1.25	23.33	0.83
5.167	1.11	11.233	4.29	17.300	1.25	23.37	0.83
5.200	1.11	11.267	5.47	17.333	1.25	23.40	0.83
5.233	1.11	11.300	6.64	17.367	1.25	23.43	0.83
5.267	1.11	11.333	6.64	17.400	1.25	23.47	0.83
5.300	1.11	11.367	6.64	17.433	1.25	23.50	0.83
5.333	1.11	11.400	6.64	17.467	1.25	23.53	0.83
5.367	1.11	11.433	6.64	17.500	1.25	23.57	0.83
5.400	1.11	11.467	6.64	17.533	1.25	23.60	0.83
5.433	1.11	11.500	6.64	17.567	1.25	23.63	0.83
5.467	1.11	11.533	6.64	17.600	1.25	23.67	0.83
5.500	1.11	11.567	6.64	17.633	1.25	23.70	0.83
5.533	1.11	11.600	6.64	17.667	1.25	23.73	0.83
5.567	1.11	11.633	6.64	17.700	1.25	23.77	0.83
5.600	1.11	11.667	6.64	17.733	1.25	23.80	0.83
5.633	1.11	11.700	6.64	17.767	1.25	23.83	0.83
5.667	1.11	11.733	6.64	17.800	1.25	23.87	0.83
5.700	1.11	11.767	13.58	17.833	1.25	23.90	0.83
5.733	1.11	11.800	20.48	17.867	1.25	23.93	0.83
5.767	1.11	11.833	20.48	17.900	1.25	23.97	0.83
5.800	1.11	11.867	20.48	17.933	1.25	24.00	0.83
5.833	1.11	11.900	20.48	17.967	1.25	24.03	0.83
5.867	1.11	11.933	20.48	18.000	1.25	24.07	0.83
5.900	1.11	11.967	20.48	18.033	1.25	24.10	0.83
5.933	1.11	12.000	20.57	18.067	1.25	24.13	0.83
5.967	1.11	12.033	84.69	18.100	1.25	24.17	0.83
6.000	1.11	12.067	84.69	18.133	1.25	24.20	0.83
6.033	1.11	12.100	84.69	18.167	1.25	24.23	0.83
6.067	1.11	12.133	84.69	18.200	1.25	24.27	0.42

Max.Eff.Inten.(mm/hr)=	84.69	35.39

over (min)	5.00	6.00	
Storage Coeff. (min)=	1.25 (ii)	5.90 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.48	0.19	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.022 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	67.19	24.53	57.37
TOTAL RAINFALL (mm)=	69.19	69.19	69.19
RUNOFF COEFFICIENT =	0.97	0.35	0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.11	12.167	84.69	18.23	1.25
0.067	0.00	6.133	1.11	12.200	84.69	18.27	1.25
0.100	0.00	6.167	1.11	12.233	84.69	18.30	1.25
0.133	0.00	6.200	1.11	12.267	47.21	18.33	1.25
0.167	0.00	6.233	1.11	12.300	9.96	18.37	1.25
0.200	0.00	6.267	1.18	12.333	9.96	18.40	1.25
0.233	0.00	6.300	1.25	12.367	9.96	18.43	1.25
0.267	0.38	6.333	1.25	12.400	9.96	18.47	1.25
0.300	0.76	6.367	1.25	12.433	9.96	18.50	1.25
0.333	0.76	6.400	1.25	12.467	9.96	18.53	1.25
0.367	0.76	6.433	1.25	12.500	9.96	18.57	1.25

0.400	0.76	6.467	1.25	12.533	9.96	18.60	1.25
0.433	0.76	6.500	1.25	12.567	9.96	18.63	1.25
0.467	0.76	6.533	1.25	12.600	9.96	18.67	1.25
0.500	0.76	6.567	1.25	12.633	9.96	18.70	1.25
0.533	0.76	6.600	1.25	12.667	9.96	18.73	1.25
0.567	0.76	6.633	1.25	12.700	9.96	18.77	1.25
0.600	0.76	6.667	1.25	12.733	9.96	18.80	1.25
0.633	0.76	6.700	1.25	12.767	7.53	18.83	1.25
0.667	0.76	6.733	1.25	12.800	5.12	18.87	1.25
0.700	0.76	6.767	1.25	12.833	5.12	18.90	1.25
0.733	0.76	6.800	1.25	12.867	5.12	18.93	1.25
0.767	0.76	6.833	1.25	12.900	5.12	18.97	1.25
0.800	0.76	6.867	1.25	12.933	5.12	19.00	1.25
0.833	0.76	6.900	1.25	12.967	5.12	19.03	1.25
0.867	0.76	6.933	1.25	13.000	5.12	19.07	1.25
0.900	0.76	6.967	1.25	13.033	5.12	19.10	1.25
0.933	0.76	7.000	1.25	13.067	5.12	19.13	1.25
0.967	0.76	7.033	1.25	13.100	5.12	19.17	1.25
1.000	0.76	7.067	1.25	13.133	5.12	19.20	1.25
1.033	0.76	7.100	1.25	13.167	5.12	19.23	1.25
1.067	0.76	7.133	1.25	13.200	5.12	19.27	1.25
1.100	0.76	7.167	1.25	13.233	5.12	19.30	1.25
1.133	0.76	7.200	1.25	13.267	4.43	19.33	1.25
1.167	0.76	7.233	1.25	13.300	3.74	19.37	1.25
1.200	0.76	7.267	1.38	13.333	3.74	19.40	1.25
1.233	0.76	7.300	1.52	13.367	3.74	19.43	1.25
1.267	0.76	7.333	1.52	13.400	3.74	19.47	1.25
1.300	0.76	7.367	1.52	13.433	3.74	19.50	1.25
1.333	0.76	7.400	1.52	13.467	3.74	19.53	1.25
1.367	0.76	7.433	1.52	13.500	3.74	19.57	1.25
1.400	0.76	7.467	1.52	13.533	3.74	19.60	1.25
1.433	0.76	7.500	1.52	13.567	3.74	19.63	1.25
1.467	0.76	7.533	1.52	13.600	3.74	19.67	1.25
1.500	0.76	7.567	1.52	13.633	3.74	19.70	1.25
1.533	0.76	7.600	1.52	13.667	3.74	19.73	1.25
1.567	0.76	7.633	1.52	13.700	3.74	19.77	1.25
1.600	0.76	7.667	1.52	13.733	3.74	19.80	1.25
1.633	0.76	7.700	1.52	13.767	3.32	19.83	1.25
1.667	0.76	7.733	1.52	13.800	2.91	19.87	1.25
1.700	0.76	7.767	1.52	13.833	2.91	19.90	1.25
1.733	0.76	7.800	1.52	13.867	2.91	19.93	1.25
1.767	0.76	7.833	1.52	13.900	2.91	19.97	1.25
1.800	0.76	7.867	1.52	13.933	2.91	20.00	1.25
1.833	0.76	7.900	1.52	13.967	2.91	20.03	1.25
1.867	0.76	7.933	1.52	14.000	2.91	20.07	1.25
1.900	0.76	7.967	1.52	14.033	2.91	20.10	1.25
1.933	0.76	8.000	1.52	14.067	2.91	20.13	1.25
1.967	0.76	8.033	1.52	14.100	2.91	20.17	1.25
2.000	0.76	8.067	1.52	14.133	2.91	20.20	1.25

2.033	0.76	8.100	1.52	14.167	2.91	20.23	1.25
2.067	0.76	8.133	1.52	14.200	2.91	20.27	1.04
2.100	0.76	8.167	1.52	14.233	2.91	20.30	0.83
2.133	0.76	8.200	1.52	14.267	2.49	20.33	0.83
2.167	0.76	8.233	1.52	14.300	2.08	20.37	0.83
2.200	0.76	8.267	1.66	14.333	2.08	20.40	0.83
2.233	0.76	8.300	1.80	14.367	2.08	20.43	0.83
2.267	0.83	8.333	1.80	14.400	2.08	20.47	0.83
2.300	0.90	8.367	1.80	14.433	2.08	20.50	0.83
2.333	0.90	8.400	1.80	14.467	2.08	20.53	0.83
2.367	0.90	8.433	1.80	14.500	2.08	20.57	0.83
2.400	0.90	8.467	1.80	14.533	2.08	20.60	0.83
2.433	0.90	8.500	1.80	14.567	2.08	20.63	0.83
2.467	0.90	8.533	1.80	14.600	2.08	20.67	0.83
2.500	0.90	8.567	1.80	14.633	2.08	20.70	0.83
2.533	0.90	8.600	1.80	14.667	2.08	20.73	0.83
2.567	0.90	8.633	1.80	14.700	2.08	20.77	0.83
2.600	0.90	8.667	1.80	14.733	2.08	20.80	0.83
2.633	0.90	8.700	1.80	14.767	2.08	20.83	0.83
2.667	0.90	8.733	1.80	14.800	2.08	20.87	0.83
2.700	0.90	8.767	1.87	14.833	2.08	20.90	0.83
2.733	0.90	8.800	1.94	14.867	2.08	20.93	0.83
2.767	0.90	8.833	1.94	14.900	2.08	20.97	0.83
2.800	0.90	8.867	1.94	14.933	2.08	21.00	0.83
2.833	0.90	8.900	1.94	14.967	2.08	21.03	0.83
2.867	0.90	8.933	1.94	15.000	2.08	21.07	0.83
2.900	0.90	8.967	1.94	15.033	2.08	21.10	0.83
2.933	0.90	9.000	1.94	15.067	2.08	21.13	0.83
2.967	0.90	9.033	1.94	15.100	2.08	21.17	0.83
3.000	0.90	9.067	1.94	15.133	2.08	21.20	0.83
3.033	0.90	9.100	1.94	15.167	2.08	21.23	0.83
3.067	0.90	9.133	1.94	15.200	2.08	21.27	0.83
3.100	0.90	9.167	1.94	15.233	2.08	21.30	0.83
3.133	0.90	9.200	1.94	15.267	2.08	21.33	0.83
3.167	0.90	9.233	1.94	15.300	2.08	21.37	0.83
3.200	0.90	9.267	2.08	15.333	2.08	21.40	0.83
3.233	0.90	9.300	2.21	15.367	2.08	21.43	0.83
3.267	0.90	9.333	2.21	15.400	2.08	21.47	0.83
3.300	0.90	9.367	2.21	15.433	2.08	21.50	0.83
3.333	0.90	9.400	2.21	15.467	2.08	21.53	0.83
3.367	0.90	9.433	2.21	15.500	2.08	21.57	0.83
3.400	0.90	9.467	2.21	15.533	2.08	21.60	0.83
3.433	0.90	9.500	2.21	15.567	2.08	21.63	0.83
3.467	0.90	9.533	2.21	15.600	2.08	21.67	0.83
3.500	0.90	9.567	2.21	15.633	2.08	21.70	0.83
3.533	0.90	9.600	2.21	15.667	2.08	21.73	0.83
3.567	0.90	9.633	2.21	15.700	2.08	21.77	0.83
3.600	0.90	9.667	2.21	15.733	2.08	21.80	0.83
3.633	0.90	9.700	2.21	15.767	2.08	21.83	0.83

3.667	0.90	9.733	2.21	15.800	2.08	21.87	0.83
3.700	0.90	9.767	2.35	15.833	2.08	21.90	0.83
3.733	0.90	9.800	2.49	15.867	2.08	21.93	0.83
3.767	0.90	9.833	2.49	15.900	2.08	21.97	0.83
3.800	0.90	9.867	2.49	15.933	2.08	22.00	0.83
3.833	0.90	9.900	2.49	15.967	2.08	22.03	0.83
3.867	0.90	9.933	2.49	16.000	2.08	22.07	0.83
3.900	0.90	9.967	2.49	16.033	2.08	22.10	0.83
3.933	0.90	10.000	2.49	16.067	2.08	22.13	0.83
3.967	0.90	10.033	2.49	16.100	2.08	22.17	0.83
4.000	0.90	10.067	2.49	16.133	2.08	22.20	0.83
4.033	0.90	10.100	2.49	16.167	2.08	22.23	0.83
4.067	0.90	10.133	2.49	16.200	2.08	22.27	0.83
4.100	0.90	10.167	2.49	16.233	2.08	22.30	0.83
4.133	0.90	10.200	2.49	16.267	1.66	22.33	0.83
4.167	0.90	10.233	2.49	16.300	1.25	22.37	0.83
4.200	0.90	10.267	2.84	16.333	1.25	22.40	0.83
4.233	0.90	10.300	3.18	16.367	1.25	22.43	0.83
4.267	1.00	10.333	3.18	16.400	1.25	22.47	0.83
4.300	1.11	10.367	3.18	16.433	1.25	22.50	0.83
4.333	1.11	10.400	3.18	16.467	1.25	22.53	0.83
4.367	1.11	10.433	3.18	16.500	1.25	22.57	0.83
4.400	1.11	10.467	3.18	16.533	1.25	22.60	0.83
4.433	1.11	10.500	3.18	16.567	1.25	22.63	0.83
4.467	1.11	10.533	3.18	16.600	1.25	22.67	0.83
4.500	1.11	10.567	3.18	16.633	1.25	22.70	0.83
4.533	1.11	10.600	3.18	16.667	1.25	22.73	0.83
4.567	1.11	10.633	3.18	16.700	1.25	22.77	0.83
4.600	1.11	10.667	3.18	16.733	1.25	22.80	0.83
4.633	1.11	10.700	3.18	16.767	1.25	22.83	0.83
4.667	1.11	10.733	3.18	16.800	1.25	22.87	0.83
4.700	1.11	10.767	3.74	16.833	1.25	22.90	0.83
4.733	1.11	10.800	4.29	16.867	1.25	22.93	0.83
4.767	1.11	10.833	4.29	16.900	1.25	22.97	0.83
4.800	1.11	10.867	4.29	16.933	1.25	23.00	0.83
4.833	1.11	10.900	4.29	16.967	1.25	23.03	0.83
4.867	1.11	10.933	4.29	17.000	1.25	23.07	0.83
4.900	1.11	10.967	4.29	17.033	1.25	23.10	0.83
4.933	1.11	11.000	4.29	17.067	1.25	23.13	0.83
4.967	1.11	11.033	4.29	17.100	1.25	23.17	0.83
5.000	1.11	11.067	4.29	17.133	1.25	23.20	0.83
5.033	1.11	11.100	4.29	17.167	1.25	23.23	0.83
5.067	1.11	11.133	4.29	17.200	1.25	23.27	0.83
5.100	1.11	11.167	4.29	17.233	1.25	23.30	0.83
5.133	1.11	11.200	4.29	17.267	1.25	23.33	0.83
5.167	1.11	11.233	4.29	17.300	1.25	23.37	0.83
5.200	1.11	11.267	5.47	17.333	1.25	23.40	0.83
5.233	1.11	11.300	6.64	17.367	1.25	23.43	0.83
5.267	1.11	11.333	6.64	17.400	1.25	23.47	0.83

5.300	1.11	11.367	6.64	17.433	1.25	23.50	0.83
5.333	1.11	11.400	6.64	17.467	1.25	23.53	0.83
5.367	1.11	11.433	6.64	17.500	1.25	23.57	0.83
5.400	1.11	11.467	6.64	17.533	1.25	23.60	0.83
5.433	1.11	11.500	6.64	17.567	1.25	23.63	0.83
5.467	1.11	11.533	6.64	17.600	1.25	23.67	0.83
5.500	1.11	11.567	6.64	17.633	1.25	23.70	0.83
5.533	1.11	11.600	6.64	17.667	1.25	23.73	0.83
5.567	1.11	11.633	6.64	17.700	1.25	23.77	0.83
5.600	1.11	11.667	6.64	17.733	1.25	23.80	0.83
5.633	1.11	11.700	6.64	17.767	1.25	23.83	0.83
5.667	1.11	11.733	6.64	17.800	1.25	23.87	0.83
5.700	1.11	11.767	13.58	17.833	1.25	23.90	0.83
5.733	1.11	11.800	20.48	17.867	1.25	23.93	0.83
5.767	1.11	11.833	20.48	17.900	1.25	23.97	0.83
5.800	1.11	11.867	20.48	17.933	1.25	24.00	0.83
5.833	1.11	11.900	20.48	17.967	1.25	24.03	0.83
5.867	1.11	11.933	20.48	18.000	1.25	24.07	0.83
5.900	1.11	11.967	20.48	18.033	1.25	24.10	0.83
5.933	1.11	12.000	20.57	18.067	1.25	24.13	0.83
5.967	1.11	12.033	84.69	18.100	1.25	24.17	0.83
6.000	1.11	12.067	84.69	18.133	1.25	24.20	0.83
6.033	1.11	12.100	84.69	18.167	1.25	24.23	0.83
6.067	1.11	12.133	84.69	18.200	1.25	24.27	0.42

Max.Eff.Inten.(mm/hr)=	84.69	34.28	
over (min)	5.00	14.00	
Storage Coeff. (min)=	2.18 (ii)	13.01 (ii)	
Unit Hyd. Tpeak (min)=	4.00	14.00	
Unit Hyd. peak (cms)=	0.39	0.08	
			TOTALS
PEAK FLOW (cms)=	0.06	0.03	0.079 (iii)
TIME TO PEAK (hrs)=	12.23	12.37	12.23
RUNOFF VOLUME (mm)=	67.19	24.53	39.88
TOTAL RAINFALL (mm)=	69.19	69.19	69.19
RUNOFF COEFFICIENT =	0.97	0.35	0.58

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.

SCS 24 hr_Exsting Conditions

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):	0.71	0.079	12.23	39.88
+ ID2= 2 (0120):	0.11	0.022	12.23	57.37
ID = 3 (0122):	0.82	0.101	12.23	42.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0150)	Area (ha)= 0.31			
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00	Dir. Conn.(%)= 54.00		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.11	12.167	84.69	18.23	1.25
0.067	0.00	6.133	1.11	12.200	84.69	18.27	1.25
0.100	0.00	6.167	1.11	12.233	84.69	18.30	1.25
0.133	0.00	6.200	1.11	12.267	47.21	18.33	1.25
0.167	0.00	6.233	1.11	12.300	9.96	18.37	1.25
0.200	0.00	6.267	1.18	12.333	9.96	18.40	1.25
0.233	0.00	6.300	1.25	12.367	9.96	18.43	1.25
0.267	0.38	6.333	1.25	12.400	9.96	18.47	1.25
0.300	0.76	6.367	1.25	12.433	9.96	18.50	1.25
0.333	0.76	6.400	1.25	12.467	9.96	18.53	1.25
0.367	0.76	6.433	1.25	12.500	9.96	18.57	1.25
0.400	0.76	6.467	1.25	12.533	9.96	18.60	1.25
0.433	0.76	6.500	1.25	12.567	9.96	18.63	1.25
0.467	0.76	6.533	1.25	12.600	9.96	18.67	1.25
0.500	0.76	6.567	1.25	12.633	9.96	18.70	1.25
0.533	0.76	6.600	1.25	12.667	9.96	18.73	1.25
0.567	0.76	6.633	1.25	12.700	9.96	18.77	1.25
0.600	0.76	6.667	1.25	12.733	9.96	18.80	1.25
0.633	0.76	6.700	1.25	12.767	7.53	18.83	1.25
0.667	0.76	6.733	1.25	12.800	5.12	18.87	1.25
0.700	0.76	6.767	1.25	12.833	5.12	18.90	1.25
0.733	0.76	6.800	1.25	12.867	5.12	18.93	1.25
0.767	0.76	6.833	1.25	12.900	5.12	18.97	1.25

SCS 24 hr_Exsting Conditions

0.800	0.76	6.867	1.25	12.933	5.12	19.00	1.25
0.833	0.76	6.900	1.25	12.967	5.12	19.03	1.25
0.867	0.76	6.933	1.25	13.000	5.12	19.07	1.25
0.900	0.76	6.967	1.25	13.033	5.12	19.10	1.25
0.933	0.76	7.000	1.25	13.067	5.12	19.13	1.25
0.967	0.76	7.033	1.25	13.100	5.12	19.17	1.25
1.000	0.76	7.067	1.25	13.133	5.12	19.20	1.25
1.033	0.76	7.100	1.25	13.167	5.12	19.23	1.25
1.067	0.76	7.133	1.25	13.200	5.12	19.27	1.25
1.100	0.76	7.167	1.25	13.233	5.12	19.30	1.25
1.133	0.76	7.200	1.25	13.267	4.43	19.33	1.25
1.167	0.76	7.233	1.25	13.300	3.74	19.37	1.25
1.200	0.76	7.267	1.38	13.333	3.74	19.40	1.25
1.233	0.76	7.300	1.52	13.367	3.74	19.43	1.25
1.267	0.76	7.333	1.52	13.400	3.74	19.47	1.25
1.300	0.76	7.367	1.52	13.433	3.74	19.50	1.25
1.333	0.76	7.400	1.52	13.467	3.74	19.53	1.25
1.367	0.76	7.433	1.52	13.500	3.74	19.57	1.25
1.400	0.76	7.467	1.52	13.533	3.74	19.60	1.25
1.433	0.76	7.500	1.52	13.567	3.74	19.63	1.25
1.467	0.76	7.533	1.52	13.600	3.74	19.67	1.25
1.500	0.76	7.567	1.52	13.633	3.74	19.70	1.25
1.533	0.76	7.600	1.52	13.667	3.74	19.73	1.25
1.567	0.76	7.633	1.52	13.700	3.74	19.77	1.25
1.600	0.76	7.667	1.52	13.733	3.74	19.80	1.25
1.633	0.76	7.700	1.52	13.767	3.32	19.83	1.25
1.667	0.76	7.733	1.52	13.800	2.91	19.87	1.25
1.700	0.76	7.767	1.52	13.833	2.91	19.90	1.25
1.733	0.76	7.800	1.52	13.867	2.91	19.93	1.25
1.767	0.76	7.833	1.52	13.900	2.91	19.97	1.25
1.800	0.76	7.867	1.52	13.933	2.91	20.00	1.25
1.833	0.76	7.900	1.52	13.967	2.91	20.03	1.25
1.867	0.76	7.933	1.52	14.000	2.91	20.07	1.25
1.900	0.76	7.967	1.52	14.033	2.91	20.10	1.25
1.933	0.76	8.000	1.52	14.067	2.91	20.13	1.25
1.967	0.76	8.033	1.52	14.100	2.91	20.17	1.25
2.000	0.76	8.067	1.52	14.133	2.91	20.20	1.25
2.033	0.76	8.100	1.52	14.167	2.91	20.23	1.25
2.067	0.76	8.133	1.52	14.200	2.91	20.27	1.04
2.100	0.76	8.167	1.52	14.233	2.91	20.30	0.83
2.133	0.76	8.200	1.52	14.267	2.49	20.33	0.83
2.167	0.76	8.233	1.52	14.300	2.08	20.37	0.83
2.200	0.76	8.267	1.66	14.333	2.08	20.40	0.83
2.233	0.76	8.300	1.80	14.367	2.08	20.43	0.83
2.267	0.83	8.333	1.80	14.400	2.08	20.47	0.83
2.300	0.90	8.367	1.80	14.433	2.08	20.50	0.83
2.333	0.90	8.400	1.80	14.467	2.08	20.53	0.83
2.367	0.90	8.433	1.80	14.500	2.08	20.57	0.83
2.400	0.90	8.467	1.80	14.533	2.08	20.60	0.83

SCS 24 hr_Exsting Conditions

2.433	0.90	8.500	1.80	14.567	2.08	20.63	0.83
2.467	0.90	8.533	1.80	14.600	2.08	20.67	0.83
2.500	0.90	8.567	1.80	14.633	2.08	20.70	0.83
2.533	0.90	8.600	1.80	14.667	2.08	20.73	0.83
2.567	0.90	8.633	1.80	14.700	2.08	20.77	0.83
2.600	0.90	8.667	1.80	14.733	2.08	20.80	0.83
2.633	0.90	8.700	1.80	14.767	2.08	20.83	0.83
2.667	0.90	8.733	1.80	14.800	2.08	20.87	0.83
2.700	0.90	8.767	1.87	14.833	2.08	20.90	0.83
2.733	0.90	8.800	1.94	14.867	2.08	20.93	0.83
2.767	0.90	8.833	1.94	14.900	2.08	20.97	0.83
2.800	0.90	8.867	1.94	14.933	2.08	21.00	0.83
2.833	0.90	8.900	1.94	14.967	2.08	21.03	0.83
2.867	0.90	8.933	1.94	15.000	2.08	21.07	0.83
2.900	0.90	8.967	1.94	15.033	2.08	21.10	0.83
2.933	0.90	9.000	1.94	15.067	2.08	21.13	0.83
2.967	0.90	9.033	1.94	15.100	2.08	21.17	0.83
3.000	0.90	9.067	1.94	15.133	2.08	21.20	0.83
3.033	0.90	9.100	1.94	15.167	2.08	21.23	0.83
3.067	0.90	9.133	1.94	15.200	2.08	21.27	0.83
3.100	0.90	9.167	1.94	15.233	2.08	21.30	0.83
3.133	0.90	9.200	1.94	15.267	2.08	21.33	0.83
3.167	0.90	9.233	1.94	15.300	2.08	21.37	0.83
3.200	0.90	9.267	2.08	15.333	2.08	21.40	0.83
3.233	0.90	9.300	2.21	15.367	2.08	21.43	0.83
3.267	0.90	9.333	2.21	15.400	2.08	21.47	0.83
3.300	0.90	9.367	2.21	15.433	2.08	21.50	0.83
3.333	0.90	9.400	2.21	15.467	2.08	21.53	0.83
3.367	0.90	9.433	2.21	15.500	2.08	21.57	0.83
3.400	0.90	9.467	2.21	15.533	2.08	21.60	0.83
3.433	0.90	9.500	2.21	15.567	2.08	21.63	0.83
3.467	0.90	9.533	2.21	15.600	2.08	21.67	0.83
3.500	0.90	9.567	2.21	15.633	2.08	21.70	0.83
3.533	0.90	9.600	2.21	15.667	2.08	21.73	0.83
3.567	0.90	9.633	2.21	15.700	2.08	21.77	0.83
3.600	0.90	9.667	2.21	15.733	2.08	21.80	0.83
3.633	0.90	9.700	2.21	15.767	2.08	21.83	0.83
3.667	0.90	9.733	2.21	15.800	2.08	21.87	0.83
3.700	0.90	9.767	2.35	15.833	2.08	21.90	0.83
3.733	0.90	9.800	2.49	15.867	2.08	21.93	0.83
3.767	0.90	9.833	2.49	15.900	2.08	21.97	0.83
3.800	0.90	9.867	2.49	15.933	2.08	22.00	0.83
3.833	0.90	9.900	2.49	15.967	2.08	22.03	0.83
3.867	0.90	9.933	2.49	16.000	2.08	22.07	0.83
3.900	0.90	9.967	2.49	16.033	2.08	22.10	0.83
3.933	0.90	10.000	2.49	16.067	2.08	22.13	0.83
3.967	0.90	10.033	2.49	16.100	2.08	22.17	0.83
4.000	0.90	10.067	2.49	16.133	2.08	22.20	0.83
4.033	0.90	10.100	2.49	16.167	2.08	22.23	0.83

SCS 24 hr_Exsting Conditions

4.067	0.90	10.133	2.49	16.200	2.08	22.27	0.83
4.100	0.90	10.167	2.49	16.233	2.08	22.30	0.83
4.133	0.90	10.200	2.49	16.267	1.66	22.33	0.83
4.167	0.90	10.233	2.49	16.300	1.25	22.37	0.83
4.200	0.90	10.267	2.84	16.333	1.25	22.40	0.83
4.233	0.90	10.300	3.18	16.367	1.25	22.43	0.83
4.267	1.00	10.333	3.18	16.400	1.25	22.47	0.83
4.300	1.11	10.367	3.18	16.433	1.25	22.50	0.83
4.333	1.11	10.400	3.18	16.467	1.25	22.53	0.83
4.367	1.11	10.433	3.18	16.500	1.25	22.57	0.83
4.400	1.11	10.467	3.18	16.533	1.25	22.60	0.83
4.433	1.11	10.500	3.18	16.567	1.25	22.63	0.83
4.467	1.11	10.533	3.18	16.600	1.25	22.67	0.83
4.500	1.11	10.567	3.18	16.633	1.25	22.70	0.83
4.533	1.11	10.600	3.18	16.667	1.25	22.73	0.83
4.567	1.11	10.633	3.18	16.700	1.25	22.77	0.83
4.600	1.11	10.667	3.18	16.733	1.25	22.80	0.83
4.633	1.11	10.700	3.18	16.767	1.25	22.83	0.83
4.667	1.11	10.733	3.18	16.800	1.25	22.87	0.83
4.700	1.11	10.767	3.74	16.833	1.25	22.90	0.83
4.733	1.11	10.800	4.29	16.867	1.25	22.93	0.83
4.767	1.11	10.833	4.29	16.900	1.25	22.97	0.83
4.800	1.11	10.867	4.29	16.933	1.25	23.00	0.83
4.833	1.11	10.900	4.29	16.967	1.25	23.03	0.83
4.867	1.11	10.933	4.29	17.000	1.25	23.07	0.83
4.900	1.11	10.967	4.29	17.033	1.25	23.10	0.83
4.933	1.11	11.000	4.29	17.067	1.25	23.13	0.83
4.967	1.11	11.033	4.29	17.100	1.25	23.17	0.83
5.000	1.11	11.067	4.29	17.133	1.25	23.20	0.83
5.033	1.11	11.100	4.29	17.167	1.25	23.23	0.83
5.067	1.11	11.133	4.29	17.200	1.25	23.27	0.83
5.100	1.11	11.167	4.29	17.233	1.25	23.30	0.83
5.133	1.11	11.200	4.29	17.267	1.25	23.33	0.83
5.167	1.11	11.233	4.29	17.300	1.25	23.37	0.83
5.200	1.11	11.267	5.47	17.333	1.25	23.40	0.83
5.233	1.11	11.300	6.64	17.367	1.25	23.43	0.83
5.267	1.11	11.333	6.64	17.400	1.25	23.47	0.83
5.300	1.11	11.367	6.64	17.433	1.25	23.50	0.83
5.333	1.11	11.400	6.64	17.467	1.25	23.53	0.83
5.367	1.11	11.433	6.64	17.500	1.25	23.57	0.83
5.400	1.11	11.467	6.64	17.533	1.25	23.60	0.83
5.433	1.11	11.500	6.64	17.567	1.25	23.63	0.83
5.467	1.11	11.533	6.64	17.600	1.25	23.67	0.83
5.500	1.11	11.567	6.64	17.633	1.25	23.70	0.83
5.533	1.11	11.600	6.64	17.667	1.25	23.73	0.83
5.567	1.11	11.633	6.64	17.700	1.25	23.77	0.83
5.600	1.11	11.667	6.64	17.733	1.25	23.80	0.83
5.633	1.11	11.700	6.64	17.767	1.25	23.83	0.83
5.667	1.11	11.733	6.64	17.800	1.25	23.87	0.83

5.700	1.11	11.767	13.58	17.833	1.25	23.90	0.83
5.733	1.11	11.800	20.48	17.867	1.25	23.93	0.83
5.767	1.11	11.833	20.48	17.900	1.25	23.97	0.83
5.800	1.11	11.867	20.48	17.933	1.25	24.00	0.83
5.833	1.11	11.900	20.48	17.967	1.25	24.03	0.83
5.867	1.11	11.933	20.48	18.000	1.25	24.07	0.83
5.900	1.11	11.967	20.48	18.033	1.25	24.10	0.83
5.933	1.11	12.000	20.57	18.067	1.25	24.13	0.83
5.967	1.11	12.033	84.69	18.100	1.25	24.17	0.83
6.000	1.11	12.067	84.69	18.133	1.25	24.20	0.83
6.033	1.11	12.100	84.69	18.167	1.25	24.23	0.83
6.067	1.11	12.133	84.69	18.200	1.25	24.27	0.42

Max.Eff.Inten.(mm/hr)=	84.69	23.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.70 (ii)	8.78 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.44	0.12	
			TOTALS
PEAK FLOW (cms)=	0.04	0.01	0.045 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	67.19	16.61	43.91
TOTAL RAINFALL (mm)=	69.19	69.19	69.19
RUNOFF COEFFICIENT =	0.97	0.24	0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)=	0.34	
ID= 1 DT= 2.0 min	Total Imp(%)=	72.00	Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.11	12.167	84.69	18.23	1.25
0.067	0.00	6.133	1.11	12.200	84.69	18.27	1.25
0.100	0.00	6.167	1.11	12.233	84.69	18.30	1.25
0.133	0.00	6.200	1.11	12.267	47.21	18.33	1.25
0.167	0.00	6.233	1.11	12.300	9.96	18.37	1.25
0.200	0.00	6.267	1.18	12.333	9.96	18.40	1.25
0.233	0.00	6.300	1.25	12.367	9.96	18.43	1.25
0.267	0.38	6.333	1.25	12.400	9.96	18.47	1.25
0.300	0.76	6.367	1.25	12.433	9.96	18.50	1.25
0.333	0.76	6.400	1.25	12.467	9.96	18.53	1.25
0.367	0.76	6.433	1.25	12.500	9.96	18.57	1.25
0.400	0.76	6.467	1.25	12.533	9.96	18.60	1.25
0.433	0.76	6.500	1.25	12.567	9.96	18.63	1.25
0.467	0.76	6.533	1.25	12.600	9.96	18.67	1.25
0.500	0.76	6.567	1.25	12.633	9.96	18.70	1.25
0.533	0.76	6.600	1.25	12.667	9.96	18.73	1.25
0.567	0.76	6.633	1.25	12.700	9.96	18.77	1.25
0.600	0.76	6.667	1.25	12.733	9.96	18.80	1.25
0.633	0.76	6.700	1.25	12.767	7.53	18.83	1.25
0.667	0.76	6.733	1.25	12.800	5.12	18.87	1.25
0.700	0.76	6.767	1.25	12.833	5.12	18.90	1.25
0.733	0.76	6.800	1.25	12.867	5.12	18.93	1.25
0.767	0.76	6.833	1.25	12.900	5.12	18.97	1.25
0.800	0.76	6.867	1.25	12.933	5.12	19.00	1.25
0.833	0.76	6.900	1.25	12.967	5.12	19.03	1.25
0.867	0.76	6.933	1.25	13.000	5.12	19.07	1.25
0.900	0.76	6.967	1.25	13.033	5.12	19.10	1.25
0.933	0.76	7.000	1.25	13.067	5.12	19.13	1.25
0.967	0.76	7.033	1.25	13.100	5.12	19.17	1.25
1.000	0.76	7.067	1.25	13.133	5.12	19.20	1.25
1.033	0.76	7.100	1.25	13.167	5.12	19.23	1.25
1.067	0.76	7.133	1.25	13.200	5.12	19.27	1.25
1.100	0.76	7.167	1.25	13.233	5.12	19.30	1.25
1.133	0.76	7.200	1.25	13.267	4.43	19.33	1.25
1.167	0.76	7.233	1.25	13.300	3.74	19.37	1.25
1.200	0.76	7.267	1.38	13.333	3.74	19.40	1.25
1.233	0.76	7.300	1.52	13.367	3.74	19.43	1.25
1.267	0.76	7.333	1.52	13.400	3.74	19.47	1.25
1.300	0.76	7.367	1.52	13.433	3.74	19.50	1.25
1.333	0.76	7.400	1.52	13.467	3.74	19.53	1.25
1.367	0.76	7.433	1.52	13.500	3.74	19.57	1.25
1.400	0.76	7.467	1.52	13.533	3.74	19.60	1.25
1.433	0.76	7.500	1.52	13.567	3.74	19.63	1.25
1.467	0.76	7.533	1.52	13.600	3.74	19.67	1.25
1.500	0.76	7.567	1.52	13.633	3.74	19.70	1.25
1.533	0.76	7.600	1.52	13.667	3.74	19.73	1.25

1.567	0.76	7.633	1.52	13.700	3.74	19.77	1.25
1.600	0.76	7.667	1.52	13.733	3.74	19.80	1.25
1.633	0.76	7.700	1.52	13.767	3.32	19.83	1.25
1.667	0.76	7.733	1.52	13.800	2.91	19.87	1.25
1.700	0.76	7.767	1.52	13.833	2.91	19.90	1.25
1.733	0.76	7.800	1.52	13.867	2.91	19.93	1.25
1.767	0.76	7.833	1.52	13.900	2.91	19.97	1.25
1.800	0.76	7.867	1.52	13.933	2.91	20.00	1.25
1.833	0.76	7.900	1.52	13.967	2.91	20.03	1.25
1.867	0.76	7.933	1.52	14.000	2.91	20.07	1.25
1.900	0.76	7.967	1.52	14.033	2.91	20.10	1.25
1.933	0.76	8.000	1.52	14.067	2.91	20.13	1.25
1.967	0.76	8.033	1.52	14.100	2.91	20.17	1.25
2.000	0.76	8.067	1.52	14.133	2.91	20.20	1.25
2.033	0.76	8.100	1.52	14.167	2.91	20.23	1.25
2.067	0.76	8.133	1.52	14.200	2.91	20.27	1.04
2.100	0.76	8.167	1.52	14.233	2.91	20.30	0.83
2.133	0.76	8.200	1.52	14.267	2.49	20.33	0.83
2.167	0.76	8.233	1.52	14.300	2.08	20.37	0.83
2.200	0.76	8.267	1.66	14.333	2.08	20.40	0.83
2.233	0.76	8.300	1.80	14.367	2.08	20.43	0.83
2.267	0.83	8.333	1.80	14.400	2.08	20.47	0.83
2.300	0.90	8.367	1.80	14.433	2.08	20.50	0.83
2.333	0.90	8.400	1.80	14.467	2.08	20.53	0.83
2.367	0.90	8.433	1.80	14.500	2.08	20.57	0.83
2.400	0.90	8.467	1.80	14.533	2.08	20.60	0.83
2.433	0.90	8.500	1.80	14.567	2.08	20.63	0.83
2.467	0.90	8.533	1.80	14.600	2.08	20.67	0.83
2.500	0.90	8.567	1.80	14.633	2.08	20.70	0.83
2.533	0.90	8.600	1.80	14.667	2.08	20.73	0.83
2.567	0.90	8.633	1.80	14.700	2.08	20.77	0.83
2.600	0.90	8.667	1.80	14.733	2.08	20.80	0.83
2.633	0.90	8.700	1.80	14.767	2.08	20.83	0.83
2.667	0.90	8.733	1.80	14.800	2.08	20.87	0.83
2.700	0.90	8.767	1.87	14.833	2.08	20.90	0.83
2.733	0.90	8.800	1.94	14.867	2.08	20.93	0.83
2.767	0.90	8.833	1.94	14.900	2.08	20.97	0.83
2.800	0.90	8.867	1.94	14.933	2.08	21.00	0.83
2.833	0.90	8.900	1.94	14.967	2.08	21.03	0.83
2.867	0.90	8.933	1.94	15.000	2.08	21.07	0.83
2.900	0.90	8.967	1.94	15.033	2.08	21.10	0.83
2.933	0.90	9.000	1.94	15.067	2.08	21.13	0.83
2.967	0.90	9.033	1.94	15.100	2.08	21.17	0.83
3.000	0.90	9.067	1.94	15.133	2.08	21.20	0.83
3.033	0.90	9.100	1.94	15.167	2.08	21.23	0.83
3.067	0.90	9.133	1.94	15.200	2.08	21.27	0.83
3.100	0.90	9.167	1.94	15.233	2.08	21.30	0.83
3.133	0.90	9.200	1.94	15.267	2.08	21.33	0.83
3.167	0.90	9.233	1.94	15.300	2.08	21.37	0.83

3.200	0.90	9.267	2.08	15.333	2.08	21.40	0.83
3.233	0.90	9.300	2.21	15.367	2.08	21.43	0.83
3.267	0.90	9.333	2.21	15.400	2.08	21.47	0.83
3.300	0.90	9.367	2.21	15.433	2.08	21.50	0.83
3.333	0.90	9.400	2.21	15.467	2.08	21.53	0.83
3.367	0.90	9.433	2.21	15.500	2.08	21.57	0.83
3.400	0.90	9.467	2.21	15.533	2.08	21.60	0.83
3.433	0.90	9.500	2.21	15.567	2.08	21.63	0.83
3.467	0.90	9.533	2.21	15.600	2.08	21.67	0.83
3.500	0.90	9.567	2.21	15.633	2.08	21.70	0.83
3.533	0.90	9.600	2.21	15.667	2.08	21.73	0.83
3.567	0.90	9.633	2.21	15.700	2.08	21.77	0.83
3.600	0.90	9.667	2.21	15.733	2.08	21.80	0.83
3.633	0.90	9.700	2.21	15.767	2.08	21.83	0.83
3.667	0.90	9.733	2.21	15.800	2.08	21.87	0.83
3.700	0.90	9.767	2.35	15.833	2.08	21.90	0.83
3.733	0.90	9.800	2.49	15.867	2.08	21.93	0.83
3.767	0.90	9.833	2.49	15.900	2.08	21.97	0.83
3.800	0.90	9.867	2.49	15.933	2.08	22.00	0.83
3.833	0.90	9.900	2.49	15.967	2.08	22.03	0.83
3.867	0.90	9.933	2.49	16.000	2.08	22.07	0.83
3.900	0.90	9.967	2.49	16.033	2.08	22.10	0.83
3.933	0.90	10.000	2.49	16.067	2.08	22.13	0.83
3.967	0.90	10.033	2.49	16.100	2.08	22.17	0.83
4.000	0.90	10.067	2.49	16.133	2.08	22.20	0.83
4.033	0.90	10.100	2.49	16.167	2.08	22.23	0.83
4.067	0.90	10.133	2.49	16.200	2.08	22.27	0.83
4.100	0.90	10.167	2.49	16.233	2.08	22.30	0.83
4.133	0.90	10.200	2.49	16.267	1.66	22.33	0.83
4.167	0.90	10.233	2.49	16.300	1.25	22.37	0.83
4.200	0.90	10.267	2.84	16.333	1.25	22.40	0.83
4.233	0.90	10.300	3.18	16.367	1.25	22.43	0.83
4.267	1.00	10.333	3.18	16.400	1.25	22.47	0.83
4.300	1.11	10.367	3.18	16.433	1.25	22.50	0.83
4.333	1.11	10.400	3.18	16.467	1.25	22.53	0.83
4.367	1.11	10.433	3.18	16.500	1.25	22.57	0.83
4.400	1.11	10.467	3.18	16.533	1.25	22.60	0.83
4.433	1.11	10.500	3.18	16.567	1.25	22.63	0.83
4.467	1.11	10.533	3.18	16.600	1.25	22.67	0.83
4.500	1.11	10.567	3.18	16.633	1.25	22.70	0.83
4.533	1.11	10.600	3.18	16.667	1.25	22.73	0.83
4.567	1.11	10.633	3.18	16.700	1.25	22.77	0.83
4.600	1.11	10.667	3.18	16.733	1.25	22.80	0.83
4.633	1.11	10.700	3.18	16.767	1.25	22.83	0.83
4.667	1.11	10.733	3.18	16.800	1.25	22.87	0.83
4.700	1.11	10.767	3.74	16.833	1.25	22.90	0.83
4.733	1.11	10.800	4.29	16.867	1.25	22.93	0.83
4.767	1.11	10.833	4.29	16.900	1.25	22.97	0.83
4.800	1.11	10.867	4.29	16.933	1.25	23.00	0.83

4.833	1.11	10.900	4.29	16.967	1.25	23.03	0.83
4.867	1.11	10.933	4.29	17.000	1.25	23.07	0.83
4.900	1.11	10.967	4.29	17.033	1.25	23.10	0.83
4.933	1.11	11.000	4.29	17.067	1.25	23.13	0.83
4.967	1.11	11.033	4.29	17.100	1.25	23.17	0.83
5.000	1.11	11.067	4.29	17.133	1.25	23.20	0.83
5.033	1.11	11.100	4.29	17.167	1.25	23.23	0.83
5.067	1.11	11.133	4.29	17.200	1.25	23.27	0.83
5.100	1.11	11.167	4.29	17.233	1.25	23.30	0.83
5.133	1.11	11.200	4.29	17.267	1.25	23.33	0.83
5.167	1.11	11.233	4.29	17.300	1.25	23.37	0.83
5.200	1.11	11.267	5.47	17.333	1.25	23.40	0.83
5.233	1.11	11.300	6.64	17.367	1.25	23.43	0.83
5.267	1.11	11.333	6.64	17.400	1.25	23.47	0.83
5.300	1.11	11.367	6.64	17.433	1.25	23.50	0.83
5.333	1.11	11.400	6.64	17.467	1.25	23.53	0.83
5.367	1.11	11.433	6.64	17.500	1.25	23.57	0.83
5.400	1.11	11.467	6.64	17.533	1.25	23.60	0.83
5.433	1.11	11.500	6.64	17.567	1.25	23.63	0.83
5.467	1.11	11.533	6.64	17.600	1.25	23.67	0.83
5.500	1.11	11.567	6.64	17.633	1.25	23.70	0.83
5.533	1.11	11.600	6.64	17.667	1.25	23.73	0.83
5.567	1.11	11.633	6.64	17.700	1.25	23.77	0.83
5.600	1.11	11.667	6.64	17.733	1.25	23.80	0.83
5.633	1.11	11.700	6.64	17.767	1.25	23.83	0.83
5.667	1.11	11.733	6.64	17.800	1.25	23.87	0.83
5.700	1.11	11.767	13.58	17.833	1.25	23.90	0.83
5.733	1.11	11.800	20.48	17.867	1.25	23.93	0.83
5.767	1.11	11.833	20.48	17.900	1.25	23.97	0.83
5.800	1.11	11.867	20.48	17.933	1.25	24.00	0.83
5.833	1.11	11.900	20.48	17.967	1.25	24.03	0.83
5.867	1.11	11.933	20.48	18.000	1.25	24.07	0.83
5.900	1.11	11.967	20.48	18.033	1.25	24.10	0.83
5.933	1.11	12.000	20.57	18.067	1.25	24.13	0.83
5.967	1.11	12.033	84.69	18.100	1.25	24.17	0.83
6.000	1.11	12.067	84.69	18.133	1.25	24.20	0.83
6.033	1.11	12.100	84.69	18.167	1.25	24.23	0.83
6.067	1.11	12.133	84.69	18.200	1.25	24.27	0.42

Max.Eff.Inten.(mm/hr)=	84.69	23.41	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.75 (ii)	6.92 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.43	0.15	
			TOTALS
PEAK FLOW (cms)=	0.06	0.01	0.062 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	67.19	16.61	53.02
TOTAL RAINFALL (mm)=	69.19	69.19	69.19

RUNOFF COEFFICIENT = 0.97 0.24 0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.045	12.23	43.91
+ ID2= 2 (0160):	0.34	0.062	12.23	53.02
ID = 3 (0162):	0.65	0.107	12.23	48.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.101	12.23	42.23
+ ID2= 2 (0162):	0.65	0.107	12.23	48.67
ID = 3 (0167):	1.47	0.208	12.23	45.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)= 0.11		
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.11	12.167	84.69	18.23	1.25
0.067	0.00	6.133	1.11	12.200	84.69	18.27	1.25
0.100	0.00	6.167	1.11	12.233	84.69	18.30	1.25
0.133	0.00	6.200	1.11	12.267	47.21	18.33	1.25
0.167	0.00	6.233	1.11	12.300	9.96	18.37	1.25
0.200	0.00	6.267	1.18	12.333	9.96	18.40	1.25
0.233	0.00	6.300	1.25	12.367	9.96	18.43	1.25
0.267	0.38	6.333	1.25	12.400	9.96	18.47	1.25
0.300	0.76	6.367	1.25	12.433	9.96	18.50	1.25
0.333	0.76	6.400	1.25	12.467	9.96	18.53	1.25
0.367	0.76	6.433	1.25	12.500	9.96	18.57	1.25
0.400	0.76	6.467	1.25	12.533	9.96	18.60	1.25
0.433	0.76	6.500	1.25	12.567	9.96	18.63	1.25
0.467	0.76	6.533	1.25	12.600	9.96	18.67	1.25
0.500	0.76	6.567	1.25	12.633	9.96	18.70	1.25
0.533	0.76	6.600	1.25	12.667	9.96	18.73	1.25
0.567	0.76	6.633	1.25	12.700	9.96	18.77	1.25
0.600	0.76	6.667	1.25	12.733	9.96	18.80	1.25
0.633	0.76	6.700	1.25	12.767	7.53	18.83	1.25
0.667	0.76	6.733	1.25	12.800	5.12	18.87	1.25
0.700	0.76	6.767	1.25	12.833	5.12	18.90	1.25
0.733	0.76	6.800	1.25	12.867	5.12	18.93	1.25
0.767	0.76	6.833	1.25	12.900	5.12	18.97	1.25
0.800	0.76	6.867	1.25	12.933	5.12	19.00	1.25
0.833	0.76	6.900	1.25	12.967	5.12	19.03	1.25
0.867	0.76	6.933	1.25	13.000	5.12	19.07	1.25
0.900	0.76	6.967	1.25	13.033	5.12	19.10	1.25
0.933	0.76	7.000	1.25	13.067	5.12	19.13	1.25
0.967	0.76	7.033	1.25	13.100	5.12	19.17	1.25
1.000	0.76	7.067	1.25	13.133	5.12	19.20	1.25
1.033	0.76	7.100	1.25	13.167	5.12	19.23	1.25
1.067	0.76	7.133	1.25	13.200	5.12	19.27	1.25
1.100	0.76	7.167	1.25	13.233	5.12	19.30	1.25
1.133	0.76	7.200	1.25	13.267	4.43	19.33	1.25
1.167	0.76	7.233	1.25	13.300	3.74	19.37	1.25
1.200	0.76	7.267	1.38	13.333	3.74	19.40	1.25
1.233	0.76	7.300	1.52	13.367	3.74	19.43	1.25
1.267	0.76	7.333	1.52	13.400	3.74	19.47	1.25
1.300	0.76	7.367	1.52	13.433	3.74	19.50	1.25
1.333	0.76	7.400	1.52	13.467	3.74	19.53	1.25
1.367	0.76	7.433	1.52	13.500	3.74	19.57	1.25
1.400	0.76	7.467	1.52	13.533	3.74	19.60	1.25
1.433	0.76	7.500	1.52	13.567	3.74	19.63	1.25
1.467	0.76	7.533	1.52	13.600	3.74	19.67	1.25
1.500	0.76	7.567	1.52	13.633	3.74	19.70	1.25

1.533	0.76	7.600	1.52	13.667	3.74	19.73	1.25
1.567	0.76	7.633	1.52	13.700	3.74	19.77	1.25
1.600	0.76	7.667	1.52	13.733	3.74	19.80	1.25
1.633	0.76	7.700	1.52	13.767	3.32	19.83	1.25
1.667	0.76	7.733	1.52	13.800	2.91	19.87	1.25
1.700	0.76	7.767	1.52	13.833	2.91	19.90	1.25
1.733	0.76	7.800	1.52	13.867	2.91	19.93	1.25
1.767	0.76	7.833	1.52	13.900	2.91	19.97	1.25
1.800	0.76	7.867	1.52	13.933	2.91	20.00	1.25
1.833	0.76	7.900	1.52	13.967	2.91	20.03	1.25
1.867	0.76	7.933	1.52	14.000	2.91	20.07	1.25
1.900	0.76	7.967	1.52	14.033	2.91	20.10	1.25
1.933	0.76	8.000	1.52	14.067	2.91	20.13	1.25
1.967	0.76	8.033	1.52	14.100	2.91	20.17	1.25
2.000	0.76	8.067	1.52	14.133	2.91	20.20	1.25
2.033	0.76	8.100	1.52	14.167	2.91	20.23	1.25
2.067	0.76	8.133	1.52	14.200	2.91	20.27	1.04
2.100	0.76	8.167	1.52	14.233	2.91	20.30	0.83
2.133	0.76	8.200	1.52	14.267	2.49	20.33	0.83
2.167	0.76	8.233	1.52	14.300	2.08	20.37	0.83
2.200	0.76	8.267	1.66	14.333	2.08	20.40	0.83
2.233	0.76	8.300	1.80	14.367	2.08	20.43	0.83
2.267	0.83	8.333	1.80	14.400	2.08	20.47	0.83
2.300	0.90	8.367	1.80	14.433	2.08	20.50	0.83
2.333	0.90	8.400	1.80	14.467	2.08	20.53	0.83
2.367	0.90	8.433	1.80	14.500	2.08	20.57	0.83
2.400	0.90	8.467	1.80	14.533	2.08	20.60	0.83
2.433	0.90	8.500	1.80	14.567	2.08	20.63	0.83
2.467	0.90	8.533	1.80	14.600	2.08	20.67	0.83
2.500	0.90	8.567	1.80	14.633	2.08	20.70	0.83
2.533	0.90	8.600	1.80	14.667	2.08	20.73	0.83
2.567	0.90	8.633	1.80	14.700	2.08	20.77	0.83
2.600	0.90	8.667	1.80	14.733	2.08	20.80	0.83
2.633	0.90	8.700	1.80	14.767	2.08	20.83	0.83
2.667	0.90	8.733	1.80	14.800	2.08	20.87	0.83
2.700	0.90	8.767	1.87	14.833	2.08	20.90	0.83
2.733	0.90	8.800	1.94	14.867	2.08	20.93	0.83
2.767	0.90	8.833	1.94	14.900	2.08	20.97	0.83
2.800	0.90	8.867	1.94	14.933	2.08	21.00	0.83
2.833	0.90	8.900	1.94	14.967	2.08	21.03	0.83
2.867	0.90	8.933	1.94	15.000	2.08	21.07	0.83
2.900	0.90	8.967	1.94	15.033	2.08	21.10	0.83
2.933	0.90	9.000	1.94	15.067	2.08	21.13	0.83
2.967	0.90	9.033	1.94	15.100	2.08	21.17	0.83
3.000	0.90	9.067	1.94	15.133	2.08	21.20	0.83
3.033	0.90	9.100	1.94	15.167	2.08	21.23	0.83
3.067	0.90	9.133	1.94	15.200	2.08	21.27	0.83
3.100	0.90	9.167	1.94	15.233	2.08	21.30	0.83
3.133	0.90	9.200	1.94	15.267	2.08	21.33	0.83

3.167	0.90	9.233	1.94	15.300	2.08	21.37	0.83
3.200	0.90	9.267	2.08	15.333	2.08	21.40	0.83
3.233	0.90	9.300	2.21	15.367	2.08	21.43	0.83
3.267	0.90	9.333	2.21	15.400	2.08	21.47	0.83
3.300	0.90	9.367	2.21	15.433	2.08	21.50	0.83
3.333	0.90	9.400	2.21	15.467	2.08	21.53	0.83
3.367	0.90	9.433	2.21	15.500	2.08	21.57	0.83
3.400	0.90	9.467	2.21	15.533	2.08	21.60	0.83
3.433	0.90	9.500	2.21	15.567	2.08	21.63	0.83
3.467	0.90	9.533	2.21	15.600	2.08	21.67	0.83
3.500	0.90	9.567	2.21	15.633	2.08	21.70	0.83
3.533	0.90	9.600	2.21	15.667	2.08	21.73	0.83
3.567	0.90	9.633	2.21	15.700	2.08	21.77	0.83
3.600	0.90	9.667	2.21	15.733	2.08	21.80	0.83
3.633	0.90	9.700	2.21	15.767	2.08	21.83	0.83
3.667	0.90	9.733	2.21	15.800	2.08	21.87	0.83
3.700	0.90	9.767	2.35	15.833	2.08	21.90	0.83
3.733	0.90	9.800	2.49	15.867	2.08	21.93	0.83
3.767	0.90	9.833	2.49	15.900	2.08	21.97	0.83
3.800	0.90	9.867	2.49	15.933	2.08	22.00	0.83
3.833	0.90	9.900	2.49	15.967	2.08	22.03	0.83
3.867	0.90	9.933	2.49	16.000	2.08	22.07	0.83
3.900	0.90	9.967	2.49	16.033	2.08	22.10	0.83
3.933	0.90	10.000	2.49	16.067	2.08	22.13	0.83
3.967	0.90	10.033	2.49	16.100	2.08	22.17	0.83
4.000	0.90	10.067	2.49	16.133	2.08	22.20	0.83
4.033	0.90	10.100	2.49	16.167	2.08	22.23	0.83
4.067	0.90	10.133	2.49	16.200	2.08	22.27	0.83
4.100	0.90	10.167	2.49	16.233	2.08	22.30	0.83
4.133	0.90	10.200	2.49	16.267	1.66	22.33	0.83
4.167	0.90	10.233	2.49	16.300	1.25	22.37	0.83
4.200	0.90	10.267	2.84	16.333	1.25	22.40	0.83
4.233	0.90	10.300	3.18	16.367	1.25	22.43	0.83
4.267	1.00	10.333	3.18	16.400	1.25	22.47	0.83
4.300	1.11	10.367	3.18	16.433	1.25	22.50	0.83
4.333	1.11	10.400	3.18	16.467	1.25	22.53	0.83
4.367	1.11	10.433	3.18	16.500	1.25	22.57	0.83
4.400	1.11	10.467	3.18	16.533	1.25	22.60	0.83
4.433	1.11	10.500	3.18	16.567	1.25	22.63	0.83
4.467	1.11	10.533	3.18	16.600	1.25	22.67	0.83
4.500	1.11	10.567	3.18	16.633	1.25	22.70	0.83
4.533	1.11	10.600	3.18	16.667	1.25	22.73	0.83
4.567	1.11	10.633	3.18	16.700	1.25	22.77	0.83
4.600	1.11	10.667	3.18	16.733	1.25	22.80	0.83
4.633	1.11	10.700	3.18	16.767	1.25	22.83	0.83
4.667	1.11	10.733	3.18	16.800	1.25	22.87	0.83
4.700	1.11	10.767	3.74	16.833	1.25	22.90	0.83
4.733	1.11	10.800	4.29	16.867	1.25	22.93	0.83
4.767	1.11	10.833	4.29	16.900	1.25	22.97	0.83

4.800	1.11	10.867	4.29	16.933	1.25	23.00	0.83
4.833	1.11	10.900	4.29	16.967	1.25	23.03	0.83
4.867	1.11	10.933	4.29	17.000	1.25	23.07	0.83
4.900	1.11	10.967	4.29	17.033	1.25	23.10	0.83
4.933	1.11	11.000	4.29	17.067	1.25	23.13	0.83
4.967	1.11	11.033	4.29	17.100	1.25	23.17	0.83
5.000	1.11	11.067	4.29	17.133	1.25	23.20	0.83
5.033	1.11	11.100	4.29	17.167	1.25	23.23	0.83
5.067	1.11	11.133	4.29	17.200	1.25	23.27	0.83
5.100	1.11	11.167	4.29	17.233	1.25	23.30	0.83
5.133	1.11	11.200	4.29	17.267	1.25	23.33	0.83
5.167	1.11	11.233	4.29	17.300	1.25	23.37	0.83
5.200	1.11	11.267	5.47	17.333	1.25	23.40	0.83
5.233	1.11	11.300	6.64	17.367	1.25	23.43	0.83
5.267	1.11	11.333	6.64	17.400	1.25	23.47	0.83
5.300	1.11	11.367	6.64	17.433	1.25	23.50	0.83
5.333	1.11	11.400	6.64	17.467	1.25	23.53	0.83
5.367	1.11	11.433	6.64	17.500	1.25	23.57	0.83
5.400	1.11	11.467	6.64	17.533	1.25	23.60	0.83
5.433	1.11	11.500	6.64	17.567	1.25	23.63	0.83
5.467	1.11	11.533	6.64	17.600	1.25	23.67	0.83
5.500	1.11	11.567	6.64	17.633	1.25	23.70	0.83
5.533	1.11	11.600	6.64	17.667	1.25	23.73	0.83
5.567	1.11	11.633	6.64	17.700	1.25	23.77	0.83
5.600	1.11	11.667	6.64	17.733	1.25	23.80	0.83
5.633	1.11	11.700	6.64	17.767	1.25	23.83	0.83
5.667	1.11	11.733	6.64	17.800	1.25	23.87	0.83
5.700	1.11	11.767	13.58	17.833	1.25	23.90	0.83
5.733	1.11	11.800	20.48	17.867	1.25	23.93	0.83
5.767	1.11	11.833	20.48	17.900	1.25	23.97	0.83
5.800	1.11	11.867	20.48	17.933	1.25	24.00	0.83
5.833	1.11	11.900	20.48	17.967	1.25	24.03	0.83
5.867	1.11	11.933	20.48	18.000	1.25	24.07	0.83
5.900	1.11	11.967	20.48	18.033	1.25	24.10	0.83
5.933	1.11	12.000	20.57	18.067	1.25	24.13	0.83
5.967	1.11	12.033	84.69	18.100	1.25	24.17	0.83
6.000	1.11	12.067	84.69	18.133	1.25	24.20	0.83
6.033	1.11	12.100	84.69	18.167	1.25	24.23	0.83
6.067	1.11	12.133	84.69	18.200	1.25	24.27	0.42

Max.Eff.Inten.(mm/hr)=	84.69	23.41	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.25 (ii)	6.00 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.48	0.17	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.021 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	67.19	16.61	55.04

TOTAL RAINFALL (mm)=	69.19	69.19	69.19
RUNOFF COEFFICIENT =	0.97	0.24	0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\525b9d7f-4906-4f50-9e96-1544ebec7980\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\525b9d7f-4906-4f50-9e96-1544ebec7980\sc

DATE: 01-16-2026 TIME: 04:30:13

USER:

COMMENTS: _____

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  ********************************************
  ** SIMULATION : 24hr SCS 25yr               **
  ********************************************
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READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\56b3036e-ed23-4339-a443-7ff2161d9767\608227cd	
Ptotal= 80.26 mm	Comments: 24hr SCS 25yr	

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.44	12.50	11.56	18.75	1.44
0.25	0.88	6.50	1.44	12.75	5.94	19.00	1.44
0.50	0.88	6.75	1.44	13.00	5.94	19.25	1.44
0.75	0.88	7.00	1.44	13.25	4.33	19.50	1.44
1.00	0.88	7.25	1.77	13.50	4.33	19.75	1.44
1.25	0.88	7.50	1.77	13.75	3.37	20.00	1.44
1.50	0.88	7.75	1.77	14.00	3.37	20.25	0.96
1.75	0.88	8.00	1.77	14.25	2.41	20.50	0.96
2.00	0.88	8.25	2.09	14.50	2.41	20.75	0.96
2.25	1.04	8.50	2.09	14.75	2.41	21.00	0.96
2.50	1.04	8.75	2.25	15.00	2.41	21.25	0.96
2.75	1.04	9.00	2.25	15.25	2.41	21.50	0.96
3.00	1.04	9.25	2.57	15.50	2.41	21.75	0.96
3.25	1.04	9.50	2.57	15.75	2.41	22.00	0.96
3.50	1.04	9.75	2.89	16.00	2.41	22.25	0.96
3.75	1.04	10.00	2.89	16.25	1.44	22.50	0.96
4.00	1.04	10.25	3.69	16.50	1.44	22.75	0.96
4.25	1.28	10.50	3.69	16.75	1.44	23.00	0.96
4.50	1.28	10.75	4.98	17.00	1.44	23.25	0.96
4.75	1.28	11.00	4.98	17.25	1.44	23.50	0.96
5.00	1.28	11.25	7.70	17.50	1.44	23.75	0.96
5.25	1.28	11.50	7.70	17.75	1.44	24.00	0.96
5.50	1.28	11.75	23.76	18.00	1.44		
5.75	1.28	12.00	98.24	18.25	1.44		
6.00	1.28	12.25	11.56	18.50	1.44		

CALIB		
STANDHYD (0120)	Area (ha)=	0.11

SCS 24 hr_Exsting Conditions

|ID= 1 DT= 2.0 min | Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.28	12.167	98.24	18.23	1.44
0.067	0.00	6.133	1.28	12.200	98.24	18.27	1.44
0.100	0.00	6.167	1.28	12.233	98.24	18.30	1.44
0.133	0.00	6.200	1.28	12.267	54.77	18.33	1.44
0.167	0.00	6.233	1.28	12.300	11.56	18.37	1.44
0.200	0.00	6.267	1.36	12.333	11.56	18.40	1.44
0.233	0.00	6.300	1.44	12.367	11.56	18.43	1.44
0.267	0.44	6.333	1.44	12.400	11.56	18.47	1.44
0.300	0.88	6.367	1.44	12.433	11.56	18.50	1.44
0.333	0.88	6.400	1.44	12.467	11.56	18.53	1.44
0.367	0.88	6.433	1.44	12.500	11.56	18.57	1.44
0.400	0.88	6.467	1.44	12.533	11.56	18.60	1.44
0.433	0.88	6.500	1.44	12.567	11.56	18.63	1.44
0.467	0.88	6.533	1.44	12.600	11.56	18.67	1.44
0.500	0.88	6.567	1.44	12.633	11.56	18.70	1.44
0.533	0.88	6.600	1.44	12.667	11.56	18.73	1.44
0.567	0.88	6.633	1.44	12.700	11.56	18.77	1.44
0.600	0.88	6.667	1.44	12.733	11.56	18.80	1.44
0.633	0.88	6.700	1.44	12.767	8.74	18.83	1.44
0.667	0.88	6.733	1.44	12.800	5.94	18.87	1.44
0.700	0.88	6.767	1.44	12.833	5.94	18.90	1.44
0.733	0.88	6.800	1.44	12.867	5.94	18.93	1.44
0.767	0.88	6.833	1.44	12.900	5.94	18.97	1.44
0.800	0.88	6.867	1.44	12.933	5.94	19.00	1.44
0.833	0.88	6.900	1.44	12.967	5.94	19.03	1.44
0.867	0.88	6.933	1.44	13.000	5.94	19.07	1.44
0.900	0.88	6.967	1.44	13.033	5.94	19.10	1.44
0.933	0.88	7.000	1.44	13.067	5.94	19.13	1.44
0.967	0.88	7.033	1.44	13.100	5.94	19.17	1.44
1.000	0.88	7.067	1.44	13.133	5.94	19.20	1.44
1.033	0.88	7.100	1.44	13.167	5.94	19.23	1.44
1.067	0.88	7.133	1.44	13.200	5.94	19.27	1.44
1.100	0.88	7.167	1.44	13.233	5.94	19.30	1.44
1.133	0.88	7.200	1.44	13.267	5.13	19.33	1.44

SCS 24 hr_Exsting Conditions

1.167	0.88	7.233	1.44	13.300	4.33	19.37	1.44
1.200	0.88	7.267	1.61	13.333	4.33	19.40	1.44
1.233	0.88	7.300	1.77	13.367	4.33	19.43	1.44
1.267	0.88	7.333	1.77	13.400	4.33	19.47	1.44
1.300	0.88	7.367	1.77	13.433	4.33	19.50	1.44
1.333	0.88	7.400	1.77	13.467	4.33	19.53	1.44
1.367	0.88	7.433	1.77	13.500	4.33	19.57	1.44
1.400	0.88	7.467	1.77	13.533	4.33	19.60	1.44
1.433	0.88	7.500	1.77	13.567	4.33	19.63	1.44
1.467	0.88	7.533	1.77	13.600	4.33	19.67	1.44
1.500	0.88	7.567	1.77	13.633	4.33	19.70	1.44
1.533	0.88	7.600	1.77	13.667	4.33	19.73	1.44
1.567	0.88	7.633	1.77	13.700	4.33	19.77	1.44
1.600	0.88	7.667	1.77	13.733	4.33	19.80	1.44
1.633	0.88	7.700	1.77	13.767	3.85	19.83	1.44
1.667	0.88	7.733	1.77	13.800	3.37	19.87	1.44
1.700	0.88	7.767	1.77	13.833	3.37	19.90	1.44
1.733	0.88	7.800	1.77	13.867	3.37	19.93	1.44
1.767	0.88	7.833	1.77	13.900	3.37	19.97	1.44
1.800	0.88	7.867	1.77	13.933	3.37	20.00	1.44
1.833	0.88	7.900	1.77	13.967	3.37	20.03	1.44
1.867	0.88	7.933	1.77	14.000	3.37	20.07	1.44
1.900	0.88	7.967	1.77	14.033	3.37	20.10	1.44
1.933	0.88	8.000	1.77	14.067	3.37	20.13	1.44
1.967	0.88	8.033	1.77	14.100	3.37	20.17	1.44
2.000	0.88	8.067	1.77	14.133	3.37	20.20	1.44
2.033	0.88	8.100	1.77	14.167	3.37	20.23	1.44
2.067	0.88	8.133	1.77	14.200	3.37	20.27	1.20
2.100	0.88	8.167	1.77	14.233	3.37	20.30	0.96
2.133	0.88	8.200	1.77	14.267	2.89	20.33	0.96
2.167	0.88	8.233	1.77	14.300	2.41	20.37	0.96
2.200	0.88	8.267	1.93	14.333	2.41	20.40	0.96
2.233	0.88	8.300	2.09	14.367	2.41	20.43	0.96
2.267	0.96	8.333	2.09	14.400	2.41	20.47	0.96
2.300	1.04	8.367	2.09	14.433	2.41	20.50	0.96
2.333	1.04	8.400	2.09	14.467	2.41	20.53	0.96
2.367	1.04	8.433	2.09	14.500	2.41	20.57	0.96
2.400	1.04	8.467	2.09	14.533	2.41	20.60	0.96
2.433	1.04	8.500	2.09	14.567	2.41	20.63	0.96
2.467	1.04	8.533	2.09	14.600	2.41	20.67	0.96
2.500	1.04	8.567	2.09	14.633	2.41	20.70	0.96
2.533	1.04	8.600	2.09	14.667	2.41	20.73	0.96
2.567	1.04	8.633	2.09	14.700	2.41	20.77	0.96
2.600	1.04	8.667	2.09	14.733	2.41	20.80	0.96
2.633	1.04	8.700	2.09	14.767	2.41	20.83	0.96
2.667	1.04	8.733	2.09	14.800	2.41	20.87	0.96
2.700	1.04	8.767	2.17	14.833	2.41	20.90	0.96
2.733	1.04	8.800	2.25	14.867	2.41	20.93	0.96
2.767	1.04	8.833	2.25	14.900	2.41	20.97	0.96

SCS 24 hr_Exsting Conditions

2.800	1.04	8.867	2.25	14.933	2.41	21.00	0.96
2.833	1.04	8.900	2.25	14.967	2.41	21.03	0.96
2.867	1.04	8.933	2.25	15.000	2.41	21.07	0.96
2.900	1.04	8.967	2.25	15.033	2.41	21.10	0.96
2.933	1.04	9.000	2.25	15.067	2.41	21.13	0.96
2.967	1.04	9.033	2.25	15.100	2.41	21.17	0.96
3.000	1.04	9.067	2.25	15.133	2.41	21.20	0.96
3.033	1.04	9.100	2.25	15.167	2.41	21.23	0.96
3.067	1.04	9.133	2.25	15.200	2.41	21.27	0.96
3.100	1.04	9.167	2.25	15.233	2.41	21.30	0.96
3.133	1.04	9.200	2.25	15.267	2.41	21.33	0.96
3.167	1.04	9.233	2.25	15.300	2.41	21.37	0.96
3.200	1.04	9.267	2.41	15.333	2.41	21.40	0.96
3.233	1.04	9.300	2.57	15.367	2.41	21.43	0.96
3.267	1.04	9.333	2.57	15.400	2.41	21.47	0.96
3.300	1.04	9.367	2.57	15.433	2.41	21.50	0.96
3.333	1.04	9.400	2.57	15.467	2.41	21.53	0.96
3.367	1.04	9.433	2.57	15.500	2.41	21.57	0.96
3.400	1.04	9.467	2.57	15.533	2.41	21.60	0.96
3.433	1.04	9.500	2.57	15.567	2.41	21.63	0.96
3.467	1.04	9.533	2.57	15.600	2.41	21.67	0.96
3.500	1.04	9.567	2.57	15.633	2.41	21.70	0.96
3.533	1.04	9.600	2.57	15.667	2.41	21.73	0.96
3.567	1.04	9.633	2.57	15.700	2.41	21.77	0.96
3.600	1.04	9.667	2.57	15.733	2.41	21.80	0.96
3.633	1.04	9.700	2.57	15.767	2.41	21.83	0.96
3.667	1.04	9.733	2.57	15.800	2.41	21.87	0.96
3.700	1.04	9.767	2.73	15.833	2.41	21.90	0.96
3.733	1.04	9.800	2.89	15.867	2.41	21.93	0.96
3.767	1.04	9.833	2.89	15.900	2.41	21.97	0.96
3.800	1.04	9.867	2.89	15.933	2.41	22.00	0.96
3.833	1.04	9.900	2.89	15.967	2.41	22.03	0.96
3.867	1.04	9.933	2.89	16.000	2.41	22.07	0.96
3.900	1.04	9.967	2.89	16.033	2.41	22.10	0.96
3.933	1.04	10.000	2.89	16.067	2.41	22.13	0.96
3.967	1.04	10.033	2.89	16.100	2.41	22.17	0.96
4.000	1.04	10.067	2.89	16.133	2.41	22.20	0.96
4.033	1.04	10.100	2.89	16.167	2.41	22.23	0.96
4.067	1.04	10.133	2.89	16.200	2.41	22.27	0.96
4.100	1.04	10.167	2.89	16.233	2.41	22.30	0.96
4.133	1.04	10.200	2.89	16.267	1.92	22.33	0.96
4.167	1.04	10.233	2.89	16.300	1.44	22.37	0.96
4.200	1.04	10.267	3.29	16.333	1.44	22.40	0.96
4.233	1.04	10.300	3.69	16.367	1.44	22.43	0.96
4.267	1.16	10.333	3.69	16.400	1.44	22.47	0.96
4.300	1.28	10.367	3.69	16.433	1.44	22.50	0.96
4.333	1.28	10.400	3.69	16.467	1.44	22.53	0.96
4.367	1.28	10.433	3.69	16.500	1.44	22.57	0.96
4.400	1.28	10.467	3.69	16.533	1.44	22.60	0.96

SCS 24 hr_Exsting Conditions

4.433	1.28	10.500	3.69	16.567	1.44	22.63	0.96
4.467	1.28	10.533	3.69	16.600	1.44	22.67	0.96
4.500	1.28	10.567	3.69	16.633	1.44	22.70	0.96
4.533	1.28	10.600	3.69	16.667	1.44	22.73	0.96
4.567	1.28	10.633	3.69	16.700	1.44	22.77	0.96
4.600	1.28	10.667	3.69	16.733	1.44	22.80	0.96
4.633	1.28	10.700	3.69	16.767	1.44	22.83	0.96
4.667	1.28	10.733	3.69	16.800	1.44	22.87	0.96
4.700	1.28	10.767	4.34	16.833	1.44	22.90	0.96
4.733	1.28	10.800	4.98	16.867	1.44	22.93	0.96
4.767	1.28	10.833	4.98	16.900	1.44	22.97	0.96
4.800	1.28	10.867	4.98	16.933	1.44	23.00	0.96
4.833	1.28	10.900	4.98	16.967	1.44	23.03	0.96
4.867	1.28	10.933	4.98	17.000	1.44	23.07	0.96
4.900	1.28	10.967	4.98	17.033	1.44	23.10	0.96
4.933	1.28	11.000	4.98	17.067	1.44	23.13	0.96
4.967	1.28	11.033	4.98	17.100	1.44	23.17	0.96
5.000	1.28	11.067	4.98	17.133	1.44	23.20	0.96
5.033	1.28	11.100	4.98	17.167	1.44	23.23	0.96
5.067	1.28	11.133	4.98	17.200	1.44	23.27	0.96
5.100	1.28	11.167	4.98	17.233	1.44	23.30	0.96
5.133	1.28	11.200	4.98	17.267	1.44	23.33	0.96
5.167	1.28	11.233	4.98	17.300	1.44	23.37	0.96
5.200	1.28	11.267	6.34	17.333	1.44	23.40	0.96
5.233	1.28	11.300	7.70	17.367	1.44	23.43	0.96
5.267	1.28	11.333	7.70	17.400	1.44	23.47	0.96
5.300	1.28	11.367	7.70	17.433	1.44	23.50	0.96
5.333	1.28	11.400	7.70	17.467	1.44	23.53	0.96
5.367	1.28	11.433	7.70	17.500	1.44	23.57	0.96
5.400	1.28	11.467	7.70	17.533	1.44	23.60	0.96
5.433	1.28	11.500	7.71	17.567	1.44	23.63	0.96
5.467	1.28	11.533	7.70	17.600	1.44	23.67	0.96
5.500	1.28	11.567	7.70	17.633	1.44	23.70	0.96
5.533	1.28	11.600	7.70	17.667	1.44	23.73	0.96
5.567	1.28	11.633	7.70	17.700	1.44	23.77	0.96
5.600	1.28	11.667	7.70	17.733	1.44	23.80	0.96
5.633	1.28	11.700	7.70	17.767	1.44	23.83	0.96
5.667	1.28	11.733	7.70	17.800	1.44	23.87	0.96
5.700	1.28	11.767	15.75	17.833	1.44	23.90	0.96
5.733	1.28	11.800	23.76	17.867	1.44	23.93	0.96
5.767	1.28	11.833	23.76	17.900	1.44	23.97	0.96
5.800	1.28	11.867	23.76	17.933	1.44	24.00	0.96
5.833	1.28	11.900	23.76	17.967	1.44	24.03	0.96
5.867	1.28	11.933	23.76	18.000	1.44	24.07	0.96
5.900	1.28	11.967	23.76	18.033	1.44	24.10	0.96
5.933	1.28	12.000	23.86	18.067	1.44	24.13	0.96
5.967	1.28	12.033	98.24	18.100	1.44	24.17	0.96
6.000	1.28	12.067	98.24	18.133	1.44	24.20	0.96
6.033	1.28	12.100	98.24	18.167	1.44	24.23	0.96

6.067	1.28	12.133	98.24	18.200	1.44	24.27	0.48

Max.Eff.Inten.(mm/hr)=	98.24	45.73	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.17 (ii)	5.56 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.49	0.20	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.026 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	78.26	31.64	67.52
TOTAL RAINFALL (mm)=	80.26	80.26	80.26
RUNOFF COEFFICIENT =	0.98	0.39	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0110)	Area (ha)=	0.71	
ID= 1 DT= 2.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.28	12.167	98.24	18.23	1.44
0.067	0.00	6.133	1.28	12.200	98.24	18.27	1.44
0.100	0.00	6.167	1.28	12.233	98.24	18.30	1.44
0.133	0.00	6.200	1.28	12.267	54.77	18.33	1.44
0.167	0.00	6.233	1.28	12.300	11.56	18.37	1.44
0.200	0.00	6.267	1.36	12.333	11.56	18.40	1.44
0.233	0.00	6.300	1.44	12.367	11.56	18.43	1.44
0.267	0.44	6.333	1.44	12.400	11.56	18.47	1.44
0.300	0.88	6.367	1.44	12.433	11.56	18.50	1.44
0.333	0.88	6.400	1.44	12.467	11.56	18.53	1.44
0.367	0.88	6.433	1.44	12.500	11.56	18.57	1.44
0.400	0.88	6.467	1.44	12.533	11.56	18.60	1.44
0.433	0.88	6.500	1.44	12.567	11.56	18.63	1.44
0.467	0.88	6.533	1.44	12.600	11.56	18.67	1.44
0.500	0.88	6.567	1.44	12.633	11.56	18.70	1.44
0.533	0.88	6.600	1.44	12.667	11.56	18.73	1.44
0.567	0.88	6.633	1.44	12.700	11.56	18.77	1.44
0.600	0.88	6.667	1.44	12.733	11.56	18.80	1.44
0.633	0.88	6.700	1.44	12.767	8.74	18.83	1.44
0.667	0.88	6.733	1.44	12.800	5.94	18.87	1.44
0.700	0.88	6.767	1.44	12.833	5.94	18.90	1.44
0.733	0.88	6.800	1.44	12.867	5.94	18.93	1.44
0.767	0.88	6.833	1.44	12.900	5.94	18.97	1.44
0.800	0.88	6.867	1.44	12.933	5.94	19.00	1.44
0.833	0.88	6.900	1.44	12.967	5.94	19.03	1.44
0.867	0.88	6.933	1.44	13.000	5.94	19.07	1.44
0.900	0.88	6.967	1.44	13.033	5.94	19.10	1.44
0.933	0.88	7.000	1.44	13.067	5.94	19.13	1.44
0.967	0.88	7.033	1.44	13.100	5.94	19.17	1.44
1.000	0.88	7.067	1.44	13.133	5.94	19.20	1.44
1.033	0.88	7.100	1.44	13.167	5.94	19.23	1.44
1.067	0.88	7.133	1.44	13.200	5.94	19.27	1.44
1.100	0.88	7.167	1.44	13.233	5.94	19.30	1.44
1.133	0.88	7.200	1.44	13.267	5.13	19.33	1.44
1.167	0.88	7.233	1.44	13.300	4.33	19.37	1.44
1.200	0.88	7.267	1.61	13.333	4.33	19.40	1.44
1.233	0.88	7.300	1.77	13.367	4.33	19.43	1.44
1.267	0.88	7.333	1.77	13.400	4.33	19.47	1.44
1.300	0.88	7.367	1.77	13.433	4.33	19.50	1.44
1.333	0.88	7.400	1.77	13.467	4.33	19.53	1.44
1.367	0.88	7.433	1.77	13.500	4.33	19.57	1.44
1.400	0.88	7.467	1.77	13.533	4.33	19.60	1.44
1.433	0.88	7.500	1.77	13.567	4.33	19.63	1.44
1.467	0.88	7.533	1.77	13.600	4.33	19.67	1.44
1.500	0.88	7.567	1.77	13.633	4.33	19.70	1.44
1.533	0.88	7.600	1.77	13.667	4.33	19.73	1.44
1.567	0.88	7.633	1.77	13.700	4.33	19.77	1.44
1.600	0.88	7.667	1.77	13.733	4.33	19.80	1.44
1.633	0.88	7.700	1.77	13.767	3.85	19.83	1.44
1.667	0.88	7.733	1.77	13.800	3.37	19.87	1.44
1.700	0.88	7.767	1.77	13.833	3.37	19.90	1.44
1.733	0.88	7.800	1.77	13.867	3.37	19.93	1.44
1.767	0.88	7.833	1.77	13.900	3.37	19.97	1.44
1.800	0.88	7.867	1.77	13.933	3.37	20.00	1.44
1.833	0.88	7.900	1.77	13.967	3.37	20.03	1.44
1.867	0.88	7.933	1.77	14.000	3.37	20.07	1.44
1.900	0.88	7.967	1.77	14.033	3.37	20.10	1.44
1.933	0.88	8.000	1.77	14.067	3.37	20.13	1.44
1.967	0.88	8.033	1.77	14.100	3.37	20.17	1.44
2.000	0.88	8.067	1.77	14.133	3.37	20.20	1.44
2.033	0.88	8.100	1.77	14.167	3.37	20.23	1.44
2.067	0.88	8.133	1.77	14.200	3.37	20.27	1.20
2.100	0.88	8.167	1.77	14.233	3.37	20.30	0.96
2.133	0.88	8.200	1.77	14.267	2.89	20.33	0.96
2.167	0.88	8.233	1.77	14.300	2.41	20.37	0.96
2.200	0.88	8.267	1.93	14.333	2.41	20.40	0.96
2.233	0.88	8.300	2.09	14.367	2.41	20.43	0.96
2.267	0.96	8.333	2.09	14.400	2.41	20.47	0.96
2.300	1.04	8.367	2.09	14.433	2.41	20.50	0.96
2.333	1.04	8.400	2.09	14.467	2.41	20.53	0.96
2.367	1.04	8.433	2.09	14.500	2.41	20.57	0.96
2.400	1.04	8.467	2.09	14.533	2.41	20.60	0.96
2.433	1.04	8.500	2.09	14.567	2.41	20.63	0.96
2.467	1.04	8.533	2.09	14.600	2.41	20.67	0.96
2.500	1.04	8.567	2.09	14.633	2.41	20.70	0.96
2.533	1.04	8.600	2.09	14.667	2.41	20.73	0.96
2.567	1.04	8.633	2.09	14.700	2.41	20.77	0.96
2.600	1.04	8.667	2.09	14.733	2.41	20.80	0.96
2.633	1.04	8.700	2.09	14.767	2.41	20.83	0.96
2.667	1.04	8.733	2.09	14.800	2.41	20.87	0.96
2.700	1.04	8.767	2.17	14.833	2.41	20.90	0.96
2.733	1.04	8.800	2.25	14.867	2.41	20.93	0.96
2.767	1.04	8.833	2.25	14.900	2.41	20.97	0.96
2.800	1.04	8.867	2.25	14.933	2.41	21.00	0.96
2.833	1.04	8.900	2.25	14.967	2.41	21.03	0.96
2.867	1.04	8.933	2.25	15.000	2.41	21.07	0.96
2.900	1.04	8.967	2.25	15.033	2.41	21.10	0.96
2.933	1.04	9.000	2.25	15.067	2.41	21.13	0.96
2.967	1.04	9.033	2.25	15.100	2.41	21.17	0.96
3.000	1.04	9.067	2.25	15.133	2.41	21.20	0.96
3.033	1.04	9.100	2.25	15.167	2.41	21.23	0.96
3.067	1.04	9.133	2.25	15.200	2.41	21.27	0.96
3.100	1.04	9.167	2.25	15.233	2.41	21.30	0.96
3.133	1.04	9.200	2.25	15.267	2.41	21.33	0.96
3.167	1.04	9.233	2.25	15.300	2.41	21.37	0.96
3.200	1.04	9.267	2.41	15.333	2.41	21.40	0.96
3.233	1.04	9.300	2.57	15.367	2.41	21.43	0.96
3.267	1.04	9.333	2.57	15.400	2.41	21.47	0.96
3.300	1.04	9.367	2.57	15.433	2.41	21.50	0.96
3.333	1.04	9.400	2.57	15.467	2.41	21.53	0.96
3.367	1.04	9.433	2.57	15.500	2.41	21.57	0.96
3.400	1.04	9.467	2.57	15.533	2.41	21.60	0.96
3.433	1.04	9.500	2.57	15.567	2.41	21.63	0.96
3.467	1.04	9.533	2.57	15.600	2.41	21.67	0.96
3.500	1.04	9.567	2.57	15.633	2.41	21.70	0.96
3.533	1.04	9.600	2.57	15.667	2.41	21.73	0.96
3.567	1.04	9.633	2.57	15.700	2.41	21.77	0.96
3.600	1.04	9.667	2.57	15.733	2.41	21.80	0.96
3.633	1.04	9.700	2.57	15.767	2.41	21.83	0.96
3.667	1.04	9.733	2.57	15.800	2.41	21.87	0.96
3.700	1.04	9.767	2.73	15.833	2.41	21.90	0.96
3.733	1.04	9.800	2.89	15.867	2.41	21.93	0.96
3.767	1.04	9.833	2.89	15.900	2.41	21.97	0.96
3.800	1.04	9.867	2.89	15.933	2.41	22.00	0.96
3.833	1.04	9.900	2.89	15.967	2.41	22.03	0.96
3.867	1.04	9.933	2.89	16.000	2.41	22.07	0.96
3.900	1.04	9.967	2.89	16.033	2.41	22.10	0.96
3.933	1.04	10.000	2.89	16.067	2.41	22.13	0.96
3.967	1.04	10.033	2.89	16.100	2.41	22.17	0.96
4.000	1.04	10.067	2.89	16.133	2.41	22.20	0.96
4.033	1.04	10.100	2.89	16.167	2.41	22.23	0.96
4.067	1.04	10.133	2.89	16.200	2.41	22.27	0.96
4.100	1.04	10.167	2.89	16.233	2.41	22.30	0.96
4.133	1.04	10.200	2.89	16.267	1.92	22.33	0.96
4.167	1.04	10.233	2.89	16.300	1.44	22.37	0.96
4.200	1.04	10.267	3.29	16.333	1.44	22.40	0.96
4.233	1.04	10.300	3.69	16.367	1.44	22.43	0.96
4.267	1.16	10.333	3.69	16.400	1.44	22.47	0.96
4.300	1.28	10.367	3.69	16.433	1.44	22.50	0.96
4.333	1.28	10.400	3.69	16.467	1.44	22.53	0.96
4.367	1.28	10.433	3.69	16.500	1.44	22.57	0.96
4.400	1.28	10.467	3.69	16.533	1.44	22.60	0.96
4.433	1.28	10.500	3.69	16.567	1.44	22.63	0.96
4.467	1.28	10.533	3.69	16.600	1.44	22.67	0.96
4.500	1.28	10.567	3.69	16.633	1.44	22.70	0.96
4.533	1.28	10.600	3.69	16.667	1.44	22.73	0.96
4.567	1.28	10.633	3.69	16.700	1.44	22.77	0.96
4.600	1.28	10.667	3.69	16.733	1.44	22.80	0.96
4.633	1.28	10.700	3.69	16.767	1.44	22.83	0.96
4.667	1.28	10.733	3.69	16.800	1.44	22.87	0.96
4.700	1.28	10.767	4.34	16.833	1.44	22.90	0.96
4.733	1.28	10.800	4.98	16.867	1.44	22.93	0.96
4.767	1.28	10.833	4.98	16.900	1.44	22.97	0.96
4.800	1.28	10.867	4.98	16.933	1.44	23.00	0.96
4.833	1.28	10.900	4.98	16.967	1.44	23.03	0.96
4.867	1.28	10.933	4.98	17.000	1.44	23.07	0.96
4.900	1.28	10.967	4.98	17.033	1.44	23.10	0.96
4.933	1.28	11.000	4.98	17.067	1.44	23.13	0.96
4.967	1.28	11.033	4.98	17.100	1.44	23.17	0.96
5.000	1.28	11.067	4.98	17.133	1.44	23.20	0.96
5.033	1.28	11.100	4.98	17.167	1.44	23.23	0.96
5.067	1.28	11.133	4.98	17.200	1.44	23.27	0.96
5.100	1.28	11.167	4.98	17.233	1.44	23.30	0.96
5.133	1.28	11.200	4.98	17.267	1.44	23.33	0.96
5.167	1.28	11.233	4.98	17.300	1.44	23.37	0.96

5.200	1.28	11.267	6.34	17.333	1.44	23.40	0.96
5.233	1.28	11.300	7.70	17.367	1.44	23.43	0.96
5.267	1.28	11.333	7.70	17.400	1.44	23.47	0.96
5.300	1.28	11.367	7.70	17.433	1.44	23.50	0.96
5.333	1.28	11.400	7.70	17.467	1.44	23.53	0.96
5.367	1.28	11.433	7.70	17.500	1.44	23.57	0.96
5.400	1.28	11.467	7.70	17.533	1.44	23.60	0.96
5.433	1.28	11.500	7.71	17.567	1.44	23.63	0.96
5.467	1.28	11.533	7.70	17.600	1.44	23.67	0.96
5.500	1.28	11.567	7.70	17.633	1.44	23.70	0.96
5.533	1.28	11.600	7.70	17.667	1.44	23.73	0.96
5.567	1.28	11.633	7.70	17.700	1.44	23.77	0.96
5.600	1.28	11.667	7.70	17.733	1.44	23.80	0.96
5.633	1.28	11.700	7.70	17.767	1.44	23.83	0.96
5.667	1.28	11.733	7.70	17.800	1.44	23.87	0.96
5.700	1.28	11.767	15.75	17.833	1.44	23.90	0.96
5.733	1.28	11.800	23.76	17.867	1.44	23.93	0.96
5.767	1.28	11.833	23.76	17.900	1.44	23.97	0.96
5.800	1.28	11.867	23.76	17.933	1.44	24.00	0.96
5.833	1.28	11.900	23.76	17.967	1.44	24.03	0.96
5.867	1.28	11.933	23.76	18.000	1.44	24.07	0.96
5.900	1.28	11.967	23.76	18.033	1.44	24.10	0.96
5.933	1.28	12.000	23.86	18.067	1.44	24.13	0.96
5.967	1.28	12.033	98.24	18.100	1.44	24.17	0.96
6.000	1.28	12.067	98.24	18.133	1.44	24.20	0.96
6.033	1.28	12.100	98.24	18.167	1.44	24.23	0.96
6.067	1.28	12.133	98.24	18.200	1.44	24.27	0.48

Max.Eff.Inten.(mm/hr)=	98.24	45.73	
over (min)	5.00	12.00	
Storage Coeff. (min)=	2.06 (ii)	11.71 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.40	0.10	
			TOTALS
PEAK FLOW (cms)=	0.07	0.04	0.099 (iii)
TIME TO PEAK (hrs)=	12.23	12.33	12.23
RUNOFF VOLUME (mm)=	78.26	31.64	48.41
TOTAL RAINFALL (mm)=	80.26	80.26	80.26
RUNOFF COEFFICIENT =	0.98	0.39	0.60

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0110):	0.71	0.099	12.23	48.41
	+ ID2= 2 (0120):	0.11	0.026	12.23	67.52
	ID = 3 (0122):	0.82	0.125	12.23	50.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB / STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.28	12.167	98.24	18.23	1.44
0.067	0.00	6.133	1.28	12.200	98.24	18.27	1.44
0.100	0.00	6.167	1.28	12.233	98.24	18.30	1.44
0.133	0.00	6.200	1.28	12.267	54.77	18.33	1.44
0.167	0.00	6.233	1.28	12.300	11.56	18.37	1.44
0.200	0.00	6.267	1.36	12.333	11.56	18.40	1.44
0.233	0.00	6.300	1.44	12.367	11.56	18.43	1.44
0.267	0.44	6.333	1.44	12.400	11.56	18.47	1.44
0.300	0.88	6.367	1.44	12.433	11.56	18.50	1.44
0.333	0.88	6.400	1.44	12.467	11.56	18.53	1.44
0.367	0.88	6.433	1.44	12.500	11.56	18.57	1.44
0.400	0.88	6.467	1.44	12.533	11.56	18.60	1.44
0.433	0.88	6.500	1.44	12.567	11.56	18.63	1.44
0.467	0.88	6.533	1.44	12.600	11.56	18.67	1.44
0.500	0.88	6.567	1.44	12.633	11.56	18.70	1.44
0.533	0.88	6.600	1.44	12.667	11.56	18.73	1.44
0.567	0.88	6.633	1.44	12.700	11.56	18.77	1.44
0.600	0.88	6.667	1.44	12.733	11.56	18.80	1.44
0.633	0.88	6.700	1.44	12.767	8.74	18.83	1.44
0.667	0.88	6.733	1.44	12.800	5.94	18.87	1.44

0.700	0.88	6.767	1.44	12.833	5.94	18.90	1.44
0.733	0.88	6.800	1.44	12.867	5.94	18.93	1.44
0.767	0.88	6.833	1.44	12.900	5.94	18.97	1.44
0.800	0.88	6.867	1.44	12.933	5.94	19.00	1.44
0.833	0.88	6.900	1.44	12.967	5.94	19.03	1.44
0.867	0.88	6.933	1.44	13.000	5.94	19.07	1.44
0.900	0.88	6.967	1.44	13.033	5.94	19.10	1.44
0.933	0.88	7.000	1.44	13.067	5.94	19.13	1.44
0.967	0.88	7.033	1.44	13.100	5.94	19.17	1.44
1.000	0.88	7.067	1.44	13.133	5.94	19.20	1.44
1.033	0.88	7.100	1.44	13.167	5.94	19.23	1.44
1.067	0.88	7.133	1.44	13.200	5.94	19.27	1.44
1.100	0.88	7.167	1.44	13.233	5.94	19.30	1.44
1.133	0.88	7.200	1.44	13.267	5.13	19.33	1.44
1.167	0.88	7.233	1.44	13.300	4.33	19.37	1.44
1.200	0.88	7.267	1.61	13.333	4.33	19.40	1.44
1.233	0.88	7.300	1.77	13.367	4.33	19.43	1.44
1.267	0.88	7.333	1.77	13.400	4.33	19.47	1.44
1.300	0.88	7.367	1.77	13.433	4.33	19.50	1.44
1.333	0.88	7.400	1.77	13.467	4.33	19.53	1.44
1.367	0.88	7.433	1.77	13.500	4.33	19.57	1.44
1.400	0.88	7.467	1.77	13.533	4.33	19.60	1.44
1.433	0.88	7.500	1.77	13.567	4.33	19.63	1.44
1.467	0.88	7.533	1.77	13.600	4.33	19.67	1.44
1.500	0.88	7.567	1.77	13.633	4.33	19.70	1.44
1.533	0.88	7.600	1.77	13.667	4.33	19.73	1.44
1.567	0.88	7.633	1.77	13.700	4.33	19.77	1.44
1.600	0.88	7.667	1.77	13.733	4.33	19.80	1.44
1.633	0.88	7.700	1.77	13.767	3.85	19.83	1.44
1.667	0.88	7.733	1.77	13.800	3.37	19.87	1.44
1.700	0.88	7.767	1.77	13.833	3.37	19.90	1.44
1.733	0.88	7.800	1.77	13.867	3.37	19.93	1.44
1.767	0.88	7.833	1.77	13.900	3.37	19.97	1.44
1.800	0.88	7.867	1.77	13.933	3.37	20.00	1.44
1.833	0.88	7.900	1.77	13.967	3.37	20.03	1.44
1.867	0.88	7.933	1.77	14.000	3.37	20.07	1.44
1.900	0.88	7.967	1.77	14.033	3.37	20.10	1.44
1.933	0.88	8.000	1.77	14.067	3.37	20.13	1.44
1.967	0.88	8.033	1.77	14.100	3.37	20.17	1.44
2.000	0.88	8.067	1.77	14.133	3.37	20.20	1.44
2.033	0.88	8.100	1.77	14.167	3.37	20.23	1.44
2.067	0.88	8.133	1.77	14.200	3.37	20.27	1.20
2.100	0.88	8.167	1.77	14.233	3.37	20.30	0.96
2.133	0.88	8.200	1.77	14.267	2.89	20.33	0.96
2.167	0.88	8.233	1.77	14.300	2.41	20.37	0.96
2.200	0.88	8.267	1.93	14.333	2.41	20.40	0.96
2.233	0.88	8.300	2.09	14.367	2.41	20.43	0.96
2.267	0.96	8.333	2.09	14.400	2.41	20.47	0.96
2.300	1.04	8.367	2.09	14.433	2.41	20.50	0.96

2.333	1.04	8.400	2.09	14.467	2.41	20.53	0.96
2.367	1.04	8.433	2.09	14.500	2.41	20.57	0.96
2.400	1.04	8.467	2.09	14.533	2.41	20.60	0.96
2.433	1.04	8.500	2.09	14.567	2.41	20.63	0.96
2.467	1.04	8.533	2.09	14.600	2.41	20.67	0.96
2.500	1.04	8.567	2.09	14.633	2.41	20.70	0.96
2.533	1.04	8.600	2.09	14.667	2.41	20.73	0.96
2.567	1.04	8.633	2.09	14.700	2.41	20.77	0.96
2.600	1.04	8.667	2.09	14.733	2.41	20.80	0.96
2.633	1.04	8.700	2.09	14.767	2.41	20.83	0.96
2.667	1.04	8.733	2.09	14.800	2.41	20.87	0.96
2.700	1.04	8.767	2.17	14.833	2.41	20.90	0.96
2.733	1.04	8.800	2.25	14.867	2.41	20.93	0.96
2.767	1.04	8.833	2.25	14.900	2.41	20.97	0.96
2.800	1.04	8.867	2.25	14.933	2.41	21.00	0.96
2.833	1.04	8.900	2.25	14.967	2.41	21.03	0.96
2.867	1.04	8.933	2.25	15.000	2.41	21.07	0.96
2.900	1.04	8.967	2.25	15.033	2.41	21.10	0.96
2.933	1.04	9.000	2.25	15.067	2.41	21.13	0.96
2.967	1.04	9.033	2.25	15.100	2.41	21.17	0.96
3.000	1.04	9.067	2.25	15.133	2.41	21.20	0.96
3.033	1.04	9.100	2.25	15.167	2.41	21.23	0.96
3.067	1.04	9.133	2.25	15.200	2.41	21.27	0.96
3.100	1.04	9.167	2.25	15.233	2.41	21.30	0.96
3.133	1.04	9.200	2.25	15.267	2.41	21.33	0.96
3.167	1.04	9.233	2.25	15.300	2.41	21.37	0.96
3.200	1.04	9.267	2.41	15.333	2.41	21.40	0.96
3.233	1.04	9.300	2.57	15.367	2.41	21.43	0.96
3.267	1.04	9.333	2.57	15.400	2.41	21.47	0.96
3.300	1.04	9.367	2.57	15.433	2.41	21.50	0.96
3.333	1.04	9.400	2.57	15.467	2.41	21.53	0.96
3.367	1.04	9.433	2.57	15.500	2.41	21.57	0.96
3.400	1.04	9.467	2.57	15.533	2.41	21.60	0.96
3.433	1.04	9.500	2.57	15.567	2.41	21.63	0.96
3.467	1.04	9.533	2.57	15.600	2.41	21.67	0.96
3.500	1.04	9.567	2.57	15.633	2.41	21.70	0.96
3.533	1.04	9.600	2.57	15.667	2.41	21.73	0.96
3.567	1.04	9.633	2.57	15.700	2.41	21.77	0.96
3.600	1.04	9.667	2.57	15.733	2.41	21.80	0.96
3.633	1.04	9.700	2.57	15.767	2.41	21.83	0.96
3.667	1.04	9.733	2.57	15.800	2.41	21.87	0.96
3.700	1.04	9.767	2.73	15.833	2.41	21.90	0.96
3.733	1.04	9.800	2.89	15.867	2.41	21.93	0.96
3.767	1.04	9.833	2.89	15.900	2.41	21.97	0.96
3.800	1.04	9.867	2.89	15.933	2.41	22.00	0.96
3.833	1.04	9.900	2.89	15.967	2.41	22.03	0.96
3.867	1.04	9.933	2.89	16.000	2.41	22.07	0.96
3.900	1.04	9.967	2.89	16.033	2.41	22.10	0.96
3.933	1.04	10.000	2.89	16.067	2.41	22.13	0.96

3.967	1.04	10.033	2.89	16.100	2.41	22.17	0.96
4.000	1.04	10.067	2.89	16.133	2.41	22.20	0.96
4.033	1.04	10.100	2.89	16.167	2.41	22.23	0.96
4.067	1.04	10.133	2.89	16.200	2.41	22.27	0.96
4.100	1.04	10.167	2.89	16.233	2.41	22.30	0.96
4.133	1.04	10.200	2.89	16.267	1.92	22.33	0.96
4.167	1.04	10.233	2.89	16.300	1.44	22.37	0.96
4.200	1.04	10.267	3.29	16.333	1.44	22.40	0.96
4.233	1.04	10.300	3.69	16.367	1.44	22.43	0.96
4.267	1.16	10.333	3.69	16.400	1.44	22.47	0.96
4.300	1.28	10.367	3.69	16.433	1.44	22.50	0.96
4.333	1.28	10.400	3.69	16.467	1.44	22.53	0.96
4.367	1.28	10.433	3.69	16.500	1.44	22.57	0.96
4.400	1.28	10.467	3.69	16.533	1.44	22.60	0.96
4.433	1.28	10.500	3.69	16.567	1.44	22.63	0.96
4.467	1.28	10.533	3.69	16.600	1.44	22.67	0.96
4.500	1.28	10.567	3.69	16.633	1.44	22.70	0.96
4.533	1.28	10.600	3.69	16.667	1.44	22.73	0.96
4.567	1.28	10.633	3.69	16.700	1.44	22.77	0.96
4.600	1.28	10.667	3.69	16.733	1.44	22.80	0.96
4.633	1.28	10.700	3.69	16.767	1.44	22.83	0.96
4.667	1.28	10.733	3.69	16.800	1.44	22.87	0.96
4.700	1.28	10.767	4.34	16.833	1.44	22.90	0.96
4.733	1.28	10.800	4.98	16.867	1.44	22.93	0.96
4.767	1.28	10.833	4.98	16.900	1.44	22.97	0.96
4.800	1.28	10.867	4.98	16.933	1.44	23.00	0.96
4.833	1.28	10.900	4.98	16.967	1.44	23.03	0.96
4.867	1.28	10.933	4.98	17.000	1.44	23.07	0.96
4.900	1.28	10.967	4.98	17.033	1.44	23.10	0.96
4.933	1.28	11.000	4.98	17.067	1.44	23.13	0.96
4.967	1.28	11.033	4.98	17.100	1.44	23.17	0.96
5.000	1.28	11.067	4.98	17.133	1.44	23.20	0.96
5.033	1.28	11.100	4.98	17.167	1.44	23.23	0.96
5.067	1.28	11.133	4.98	17.200	1.44	23.27	0.96
5.100	1.28	11.167	4.98	17.233	1.44	23.30	0.96
5.133	1.28	11.200	4.98	17.267	1.44	23.33	0.96
5.167	1.28	11.233	4.98	17.300	1.44	23.37	0.96
5.200	1.28	11.267	6.34	17.333	1.44	23.40	0.96
5.233	1.28	11.300	7.70	17.367	1.44	23.43	0.96
5.267	1.28	11.333	7.70	17.400	1.44	23.47	0.96
5.300	1.28	11.367	7.70	17.433	1.44	23.50	0.96
5.333	1.28	11.400	7.70	17.467	1.44	23.53	0.96
5.367	1.28	11.433	7.70	17.500	1.44	23.57	0.96
5.400	1.28	11.467	7.70	17.533	1.44	23.60	0.96
5.433	1.28	11.500	7.71	17.567	1.44	23.63	0.96
5.467	1.28	11.533	7.70	17.600	1.44	23.67	0.96
5.500	1.28	11.567	7.70	17.633	1.44	23.70	0.96
5.533	1.28	11.600	7.70	17.667	1.44	23.73	0.96
5.567	1.28	11.633	7.70	17.700	1.44	23.77	0.96

5.600	1.28	11.667	7.70	17.733	1.44	23.80	0.96
5.633	1.28	11.700	7.70	17.767	1.44	23.83	0.96
5.667	1.28	11.733	7.70	17.800	1.44	23.87	0.96
5.700	1.28	11.767	15.75	17.833	1.44	23.90	0.96
5.733	1.28	11.800	23.76	17.867	1.44	23.93	0.96
5.767	1.28	11.833	23.76	17.900	1.44	23.97	0.96
5.800	1.28	11.867	23.76	17.933	1.44	24.00	0.96
5.833	1.28	11.900	23.76	17.967	1.44	24.03	0.96
5.867	1.28	11.933	23.76	18.000	1.44	24.07	0.96
5.900	1.28	11.967	23.76	18.033	1.44	24.10	0.96
5.933	1.28	12.000	23.86	18.067	1.44	24.13	0.96
5.967	1.28	12.033	98.24	18.100	1.44	24.17	0.96
6.000	1.28	12.067	98.24	18.133	1.44	24.20	0.96
6.033	1.28	12.100	98.24	18.167	1.44	24.23	0.96
6.067	1.28	12.133	98.24	18.200	1.44	24.27	0.48

Max.Eff.Inten.(mm/hr)=	98.24	30.91	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.60 (ii)	8.27 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.45	0.13	
			TOTALS
PEAK FLOW (cms)=	0.05	0.01	0.053 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	78.26	21.85	52.30
TOTAL RAINFALL (mm)=	80.26	80.26	80.26
RUNOFF COEFFICIENT =	0.98	0.27	0.65

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.28	12.167	98.24	18.23	1.44
0.067	0.00	6.133	1.28	12.200	98.24	18.27	1.44
0.100	0.00	6.167	1.28	12.233	98.24	18.30	1.44
0.133	0.00	6.200	1.28	12.267	54.77	18.33	1.44
0.167	0.00	6.233	1.28	12.300	11.56	18.37	1.44
0.200	0.00	6.267	1.36	12.333	11.56	18.40	1.44
0.233	0.00	6.300	1.44	12.367	11.56	18.43	1.44
0.267	0.44	6.333	1.44	12.400	11.56	18.47	1.44
0.300	0.88	6.367	1.44	12.433	11.56	18.50	1.44
0.333	0.88	6.400	1.44	12.467	11.56	18.53	1.44
0.367	0.88	6.433	1.44	12.500	11.56	18.57	1.44
0.400	0.88	6.467	1.44	12.533	11.56	18.60	1.44
0.433	0.88	6.500	1.44	12.567	11.56	18.63	1.44
0.467	0.88	6.533	1.44	12.600	11.56	18.67	1.44
0.500	0.88	6.567	1.44	12.633	11.56	18.70	1.44
0.533	0.88	6.600	1.44	12.667	11.56	18.73	1.44
0.567	0.88	6.633	1.44	12.700	11.56	18.77	1.44
0.600	0.88	6.667	1.44	12.733	11.56	18.80	1.44
0.633	0.88	6.700	1.44	12.767	8.74	18.83	1.44
0.667	0.88	6.733	1.44	12.800	5.94	18.87	1.44
0.700	0.88	6.767	1.44	12.833	5.94	18.90	1.44
0.733	0.88	6.800	1.44	12.867	5.94	18.93	1.44
0.767	0.88	6.833	1.44	12.900	5.94	18.97	1.44
0.800	0.88	6.867	1.44	12.933	5.94	19.00	1.44
0.833	0.88	6.900	1.44	12.967	5.94	19.03	1.44
0.867	0.88	6.933	1.44	13.000	5.94	19.07	1.44
0.900	0.88	6.967	1.44	13.033	5.94	19.10	1.44
0.933	0.88	7.000	1.44	13.067	5.94	19.13	1.44
0.967	0.88	7.033	1.44	13.100	5.94	19.17	1.44
1.000	0.88	7.067	1.44	13.133	5.94	19.20	1.44
1.033	0.88	7.100	1.44	13.167	5.94	19.23	1.44
1.067	0.88	7.133	1.44	13.200	5.94	19.27	1.44
1.100	0.88	7.167	1.44	13.233	5.94	19.30	1.44
1.133	0.88	7.200	1.44	13.267	5.13	19.33	1.44
1.167	0.88	7.233	1.44	13.300	4.33	19.37	1.44
1.200	0.88	7.267	1.61	13.333	4.33	19.40	1.44
1.233	0.88	7.300	1.77	13.367	4.33	19.43	1.44
1.267	0.88	7.333	1.77	13.400	4.33	19.47	1.44
1.300	0.88	7.367	1.77	13.433	4.33	19.50	1.44
1.333	0.88	7.400	1.77	13.467	4.33	19.53	1.44
1.367	0.88	7.433	1.77	13.500	4.33	19.57	1.44
1.400	0.88	7.467	1.77	13.533	4.33	19.60	1.44
1.433	0.88	7.500	1.77	13.567	4.33	19.63	1.44

1.467	0.88	7.533	1.77	13.600	4.33	19.67	1.44
1.500	0.88	7.567	1.77	13.633	4.33	19.70	1.44
1.533	0.88	7.600	1.77	13.667	4.33	19.73	1.44
1.567	0.88	7.633	1.77	13.700	4.33	19.77	1.44
1.600	0.88	7.667	1.77	13.733	4.33	19.80	1.44
1.633	0.88	7.700	1.77	13.767	3.85	19.83	1.44
1.667	0.88	7.733	1.77	13.800	3.37	19.87	1.44
1.700	0.88	7.767	1.77	13.833	3.37	19.90	1.44
1.733	0.88	7.800	1.77	13.867	3.37	19.93	1.44
1.767	0.88	7.833	1.77	13.900	3.37	19.97	1.44
1.800	0.88	7.867	1.77	13.933	3.37	20.00	1.44
1.833	0.88	7.900	1.77	13.967	3.37	20.03	1.44
1.867	0.88	7.933	1.77	14.000	3.37	20.07	1.44
1.900	0.88	7.967	1.77	14.033	3.37	20.10	1.44
1.933	0.88	8.000	1.77	14.067	3.37	20.13	1.44
1.967	0.88	8.033	1.77	14.100	3.37	20.17	1.44
2.000	0.88	8.067	1.77	14.133	3.37	20.20	1.44
2.033	0.88	8.100	1.77	14.167	3.37	20.23	1.44
2.067	0.88	8.133	1.77	14.200	3.37	20.27	1.20
2.100	0.88	8.167	1.77	14.233	3.37	20.30	0.96
2.133	0.88	8.200	1.77	14.267	2.89	20.33	0.96
2.167	0.88	8.233	1.77	14.300	2.41	20.37	0.96
2.200	0.88	8.267	1.93	14.333	2.41	20.40	0.96
2.233	0.88	8.300	2.09	14.367	2.41	20.43	0.96
2.267	0.96	8.333	2.09	14.400	2.41	20.47	0.96
2.300	1.04	8.367	2.09	14.433	2.41	20.50	0.96
2.333	1.04	8.400	2.09	14.467	2.41	20.53	0.96
2.367	1.04	8.433	2.09	14.500	2.41	20.57	0.96
2.400	1.04	8.467	2.09	14.533	2.41	20.60	0.96
2.433	1.04	8.500	2.09	14.567	2.41	20.63	0.96
2.467	1.04	8.533	2.09	14.600	2.41	20.67	0.96
2.500	1.04	8.567	2.09	14.633	2.41	20.70	0.96
2.533	1.04	8.600	2.09	14.667	2.41	20.73	0.96
2.567	1.04	8.633	2.09	14.700	2.41	20.77	0.96
2.600	1.04	8.667	2.09	14.733	2.41	20.80	0.96
2.633	1.04	8.700	2.09	14.767	2.41	20.83	0.96
2.667	1.04	8.733	2.09	14.800	2.41	20.87	0.96
2.700	1.04	8.767	2.17	14.833	2.41	20.90	0.96
2.733	1.04	8.800	2.25	14.867	2.41	20.93	0.96
2.767	1.04	8.833	2.25	14.900	2.41	20.97	0.96
2.800	1.04	8.867	2.25	14.933	2.41	21.00	0.96
2.833	1.04	8.900	2.25	14.967	2.41	21.03	0.96
2.867	1.04	8.933	2.25	15.000	2.41	21.07	0.96
2.900	1.04	8.967	2.25	15.033	2.41	21.10	0.96
2.933	1.04	9.000	2.25	15.067	2.41	21.13	0.96
2.967	1.04	9.033	2.25	15.100	2.41	21.17	0.96
3.000	1.04	9.067	2.25	15.133	2.41	21.20	0.96
3.033	1.04	9.100	2.25	15.167	2.41	21.23	0.96
3.067	1.04	9.133	2.25	15.200	2.41	21.27	0.96

3.100	1.04	9.167	2.25	15.233	2.41	21.30	0.96
3.133	1.04	9.200	2.25	15.267	2.41	21.33	0.96
3.167	1.04	9.233	2.25	15.300	2.41	21.37	0.96
3.200	1.04	9.267	2.41	15.333	2.41	21.40	0.96
3.233	1.04	9.300	2.57	15.367	2.41	21.43	0.96
3.267	1.04	9.333	2.57	15.400	2.41	21.47	0.96
3.300	1.04	9.367	2.57	15.433	2.41	21.50	0.96
3.333	1.04	9.400	2.57	15.467	2.41	21.53	0.96
3.367	1.04	9.433	2.57	15.500	2.41	21.57	0.96
3.400	1.04	9.467	2.57	15.533	2.41	21.60	0.96
3.433	1.04	9.500	2.57	15.567	2.41	21.63	0.96
3.467	1.04	9.533	2.57	15.600	2.41	21.67	0.96
3.500	1.04	9.567	2.57	15.633	2.41	21.70	0.96
3.533	1.04	9.600	2.57	15.667	2.41	21.73	0.96
3.567	1.04	9.633	2.57	15.700	2.41	21.77	0.96
3.600	1.04	9.667	2.57	15.733	2.41	21.80	0.96
3.633	1.04	9.700	2.57	15.767	2.41	21.83	0.96
3.667	1.04	9.733	2.57	15.800	2.41	21.87	0.96
3.700	1.04	9.767	2.73	15.833	2.41	21.90	0.96
3.733	1.04	9.800	2.89	15.867	2.41	21.93	0.96
3.767	1.04	9.833	2.89	15.900	2.41	21.97	0.96
3.800	1.04	9.867	2.89	15.933	2.41	22.00	0.96
3.833	1.04	9.900	2.89	15.967	2.41	22.03	0.96
3.867	1.04	9.933	2.89	16.000	2.41	22.07	0.96
3.900	1.04	9.967	2.89	16.033	2.41	22.10	0.96
3.933	1.04	10.000	2.89	16.067	2.41	22.13	0.96
3.967	1.04	10.033	2.89	16.100	2.41	22.17	0.96
4.000	1.04	10.067	2.89	16.133	2.41	22.20	0.96
4.033	1.04	10.100	2.89	16.167	2.41	22.23	0.96
4.067	1.04	10.133	2.89	16.200	2.41	22.27	0.96
4.100	1.04	10.167	2.89	16.233	2.41	22.30	0.96
4.133	1.04	10.200	2.89	16.267	1.92	22.33	0.96
4.167	1.04	10.233	2.89	16.300	1.44	22.37	0.96
4.200	1.04	10.267	3.29	16.333	1.44	22.40	0.96
4.233	1.04	10.300	3.69	16.367	1.44	22.43	0.96
4.267	1.16	10.333	3.69	16.400	1.44	22.47	0.96
4.300	1.28	10.367	3.69	16.433	1.44	22.50	0.96
4.333	1.28	10.400	3.69	16.467	1.44	22.53	0.96
4.367	1.28	10.433	3.69	16.500	1.44	22.57	0.96
4.400	1.28	10.467	3.69	16.533	1.44	22.60	0.96
4.433	1.28	10.500	3.69	16.567	1.44	22.63	0.96
4.467	1.28	10.533	3.69	16.600	1.44	22.67	0.96
4.500	1.28	10.567	3.69	16.633	1.44	22.70	0.96
4.533	1.28	10.600	3.69	16.667	1.44	22.73	0.96
4.567	1.28	10.633	3.69	16.700	1.44	22.77	0.96
4.600	1.28	10.667	3.69	16.733	1.44	22.80	0.96
4.633	1.28	10.700	3.69	16.767	1.44	22.83	0.96
4.667	1.28	10.733	3.69	16.800	1.44	22.87	0.96
4.700	1.28	10.767	4.34	16.833	1.44	22.90	0.96

4.733	1.28	10.800	4.98	16.867	1.44	22.93	0.96
4.767	1.28	10.833	4.98	16.900	1.44	22.97	0.96
4.800	1.28	10.867	4.98	16.933	1.44	23.00	0.96
4.833	1.28	10.900	4.98	16.967	1.44	23.03	0.96
4.867	1.28	10.933	4.98	17.000	1.44	23.07	0.96
4.900	1.28	10.967	4.98	17.033	1.44	23.10	0.96
4.933	1.28	11.000	4.98	17.067	1.44	23.13	0.96
4.967	1.28	11.033	4.98	17.100	1.44	23.17	0.96
5.000	1.28	11.067	4.98	17.133	1.44	23.20	0.96
5.033	1.28	11.100	4.98	17.167	1.44	23.23	0.96
5.067	1.28	11.133	4.98	17.200	1.44	23.27	0.96
5.100	1.28	11.167	4.98	17.233	1.44	23.30	0.96
5.133	1.28	11.200	4.98	17.267	1.44	23.33	0.96
5.167	1.28	11.233	4.98	17.300	1.44	23.37	0.96
5.200	1.28	11.267	6.34	17.333	1.44	23.40	0.96
5.233	1.28	11.300	7.70	17.367	1.44	23.43	0.96
5.267	1.28	11.333	7.70	17.400	1.44	23.47	0.96
5.300	1.28	11.367	7.70	17.433	1.44	23.50	0.96
5.333	1.28	11.400	7.70	17.467	1.44	23.53	0.96
5.367	1.28	11.433	7.70	17.500	1.44	23.57	0.96
5.400	1.28	11.467	7.70	17.533	1.44	23.60	0.96
5.433	1.28	11.500	7.71	17.567	1.44	23.63	0.96
5.467	1.28	11.533	7.70	17.600	1.44	23.67	0.96
5.500	1.28	11.567	7.70	17.633	1.44	23.70	0.96
5.533	1.28	11.600	7.70	17.667	1.44	23.73	0.96
5.567	1.28	11.633	7.70	17.700	1.44	23.77	0.96
5.600	1.28	11.667	7.70	17.733	1.44	23.80	0.96
5.633	1.28	11.700	7.70	17.767	1.44	23.83	0.96
5.667	1.28	11.733	7.70	17.800	1.44	23.87	0.96
5.700	1.28	11.767	15.75	17.833	1.44	23.90	0.96
5.733	1.28	11.800	23.76	17.867	1.44	23.93	0.96
5.767	1.28	11.833	23.76	17.900	1.44	23.97	0.96
5.800	1.28	11.867	23.76	17.933	1.44	24.00	0.96
5.833	1.28	11.900	23.76	17.967	1.44	24.03	0.96
5.867	1.28	11.933	23.76	18.000	1.44	24.07	0.96
5.900	1.28	11.967	23.76	18.033	1.44	24.10	0.96
5.933	1.28	12.000	23.86	18.067	1.44	24.13	0.96
5.967	1.28	12.033	98.24	18.100	1.44	24.17	0.96
6.000	1.28	12.067	98.24	18.133	1.44	24.20	0.96
6.033	1.28	12.100	98.24	18.167	1.44	24.23	0.96
6.067	1.28	12.133	98.24	18.200	1.44	24.27	0.48

Max.Eff.Inten.(mm/hr)=	98.24	30.91	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.65 (ii)	6.52 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.44	0.16	
			TOTALS
PEAK FLOW (cms)=	0.07	0.01	0.073 (iii)

TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	78.26	21.85	62.46
TOTAL RAINFALL (mm)=	80.26	80.26	80.26
RUNOFF COEFFICIENT =	0.98	0.27	0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):	0.31	0.053	12.23	52.30
+ ID2= 2 (0160):	0.34	0.073	12.23	62.46
ID = 3 (0162):	0.65	0.126	12.23	57.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):	0.82	0.125	12.23	50.98
+ ID2= 2 (0162):	0.65	0.126	12.23	57.61
ID = 3 (0167):	1.47	0.251	12.23	53.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)=	0.11	
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)= 76.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.08	0.03
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	27.08	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.28	12.167	98.24	18.23	1.44
0.067	0.00	6.133	1.28	12.200	98.24	18.27	1.44
0.100	0.00	6.167	1.28	12.233	98.24	18.30	1.44
0.133	0.00	6.200	1.28	12.267	54.77	18.33	1.44
0.167	0.00	6.233	1.28	12.300	11.56	18.37	1.44
0.200	0.00	6.267	1.36	12.333	11.56	18.40	1.44
0.233	0.00	6.300	1.44	12.367	11.56	18.43	1.44
0.267	0.44	6.333	1.44	12.400	11.56	18.47	1.44
0.300	0.88	6.367	1.44	12.433	11.56	18.50	1.44
0.333	0.88	6.400	1.44	12.467	11.56	18.53	1.44
0.367	0.88	6.433	1.44	12.500	11.56	18.57	1.44
0.400	0.88	6.467	1.44	12.533	11.56	18.60	1.44
0.433	0.88	6.500	1.44	12.567	11.56	18.63	1.44
0.467	0.88	6.533	1.44	12.600	11.56	18.67	1.44
0.500	0.88	6.567	1.44	12.633	11.56	18.70	1.44
0.533	0.88	6.600	1.44	12.667	11.56	18.73	1.44
0.567	0.88	6.633	1.44	12.700	11.56	18.77	1.44
0.600	0.88	6.667	1.44	12.733	11.56	18.80	1.44
0.633	0.88	6.700	1.44	12.767	8.74	18.83	1.44
0.667	0.88	6.733	1.44	12.800	5.94	18.87	1.44
0.700	0.88	6.767	1.44	12.833	5.94	18.90	1.44
0.733	0.88	6.800	1.44	12.867	5.94	18.93	1.44
0.767	0.88	6.833	1.44	12.900	5.94	18.97	1.44
0.800	0.88	6.867	1.44	12.933	5.94	19.00	1.44
0.833	0.88	6.900	1.44	12.967	5.94	19.03	1.44
0.867	0.88	6.933	1.44	13.000	5.94	19.07	1.44
0.900	0.88	6.967	1.44	13.033	5.94	19.10	1.44
0.933	0.88	7.000	1.44	13.067	5.94	19.13	1.44
0.967	0.88	7.033	1.44	13.100	5.94	19.17	1.44
1.000	0.88	7.067	1.44	13.133	5.94	19.20	1.44
1.033	0.88	7.100	1.44	13.167	5.94	19.23	1.44
1.067	0.88	7.133	1.44	13.200	5.94	19.27	1.44
1.100	0.88	7.167	1.44	13.233	5.94	19.30	1.44
1.133	0.88	7.200	1.44	13.267	5.13	19.33	1.44
1.167	0.88	7.233	1.44	13.300	4.33	19.37	1.44
1.200	0.88	7.267	1.61	13.333	4.33	19.40	1.44
1.233	0.88	7.300	1.77	13.367	4.33	19.43	1.44
1.267	0.88	7.333	1.77	13.400	4.33	19.47	1.44
1.300	0.88	7.367	1.77	13.433	4.33	19.50	1.44
1.333	0.88	7.400	1.77	13.467	4.33	19.53	1.44
1.367	0.88	7.433	1.77	13.500	4.33	19.57	1.44
1.400	0.88	7.467	1.77	13.533	4.33	19.60	1.44

1.433	0.88	7.500	1.77	13.567	4.33	19.63	1.44
1.467	0.88	7.533	1.77	13.600	4.33	19.67	1.44
1.500	0.88	7.567	1.77	13.633	4.33	19.70	1.44
1.533	0.88	7.600	1.77	13.667	4.33	19.73	1.44
1.567	0.88	7.633	1.77	13.700	4.33	19.77	1.44
1.600	0.88	7.667	1.77	13.733	4.33	19.80	1.44
1.633	0.88	7.700	1.77	13.767	3.85	19.83	1.44
1.667	0.88	7.733	1.77	13.800	3.37	19.87	1.44
1.700	0.88	7.767	1.77	13.833	3.37	19.90	1.44
1.733	0.88	7.800	1.77	13.867	3.37	19.93	1.44
1.767	0.88	7.833	1.77	13.900	3.37	19.97	1.44
1.800	0.88	7.867	1.77	13.933	3.37	20.00	1.44
1.833	0.88	7.900	1.77	13.967	3.37	20.03	1.44
1.867	0.88	7.933	1.77	14.000	3.37	20.07	1.44
1.900	0.88	7.967	1.77	14.033	3.37	20.10	1.44
1.933	0.88	8.000	1.77	14.067	3.37	20.13	1.44
1.967	0.88	8.033	1.77	14.100	3.37	20.17	1.44
2.000	0.88	8.067	1.77	14.133	3.37	20.20	1.44
2.033	0.88	8.100	1.77	14.167	3.37	20.23	1.44
2.067	0.88	8.133	1.77	14.200	3.37	20.27	1.20
2.100	0.88	8.167	1.77	14.233	3.37	20.30	0.96
2.133	0.88	8.200	1.77	14.267	2.89	20.33	0.96
2.167	0.88	8.233	1.77	14.300	2.41	20.37	0.96
2.200	0.88	8.267	1.93	14.333	2.41	20.40	0.96
2.233	0.88	8.300	2.09	14.367	2.41	20.43	0.96
2.267	0.96	8.333	2.09	14.400	2.41	20.47	0.96
2.300	1.04	8.367	2.09	14.433	2.41	20.50	0.96
2.333	1.04	8.400	2.09	14.467	2.41	20.53	0.96
2.367	1.04	8.433	2.09	14.500	2.41	20.57	0.96
2.400	1.04	8.467	2.09	14.533	2.41	20.60	0.96
2.433	1.04	8.500	2.09	14.567	2.41	20.63	0.96
2.467	1.04	8.533	2.09	14.600	2.41	20.67	0.96
2.500	1.04	8.567	2.09	14.633	2.41	20.70	0.96
2.533	1.04	8.600	2.09	14.667	2.41	20.73	0.96
2.567	1.04	8.633	2.09	14.700	2.41	20.77	0.96
2.600	1.04	8.667	2.09	14.733	2.41	20.80	0.96
2.633	1.04	8.700	2.09	14.767	2.41	20.83	0.96
2.667	1.04	8.733	2.09	14.800	2.41	20.87	0.96
2.700	1.04	8.767	2.17	14.833	2.41	20.90	0.96
2.733	1.04	8.800	2.25	14.867	2.41	20.93	0.96
2.767	1.04	8.833	2.25	14.900	2.41	20.97	0.96
2.800	1.04	8.867	2.25	14.933	2.41	21.00	0.96
2.833	1.04	8.900	2.25	14.967	2.41	21.03	0.96
2.867	1.04	8.933	2.25	15.000	2.41	21.07	0.96
2.900	1.04	8.967	2.25	15.033	2.41	21.10	0.96
2.933	1.04	9.000	2.25	15.067	2.41	21.13	0.96
2.967	1.04	9.033	2.25	15.100	2.41	21.17	0.96
3.000	1.04	9.067	2.25	15.133	2.41	21.20	0.96
3.033	1.04	9.100	2.25	15.167	2.41	21.23	0.96

3.067	1.04	9.133	2.25	15.200	2.41	21.27	0.96
3.100	1.04	9.167	2.25	15.233	2.41	21.30	0.96
3.133	1.04	9.200	2.25	15.267	2.41	21.33	0.96
3.167	1.04	9.233	2.25	15.300	2.41	21.37	0.96
3.200	1.04	9.267	2.41	15.333	2.41	21.40	0.96
3.233	1.04	9.300	2.57	15.367	2.41	21.43	0.96
3.267	1.04	9.333	2.57	15.400	2.41	21.47	0.96
3.300	1.04	9.367	2.57	15.433	2.41	21.50	0.96
3.333	1.04	9.400	2.57	15.467	2.41	21.53	0.96
3.367	1.04	9.433	2.57	15.500	2.41	21.57	0.96
3.400	1.04	9.467	2.57	15.533	2.41	21.60	0.96
3.433	1.04	9.500	2.57	15.567	2.41	21.63	0.96
3.467	1.04	9.533	2.57	15.600	2.41	21.67	0.96
3.500	1.04	9.567	2.57	15.633	2.41	21.70	0.96
3.533	1.04	9.600	2.57	15.667	2.41	21.73	0.96
3.567	1.04	9.633	2.57	15.700	2.41	21.77	0.96
3.600	1.04	9.667	2.57	15.733	2.41	21.80	0.96
3.633	1.04	9.700	2.57	15.767	2.41	21.83	0.96
3.667	1.04	9.733	2.57	15.800	2.41	21.87	0.96
3.700	1.04	9.767	2.73	15.833	2.41	21.90	0.96
3.733	1.04	9.800	2.89	15.867	2.41	21.93	0.96
3.767	1.04	9.833	2.89	15.900	2.41	21.97	0.96
3.800	1.04	9.867	2.89	15.933	2.41	22.00	0.96
3.833	1.04	9.900	2.89	15.967	2.41	22.03	0.96
3.867	1.04	9.933	2.89	16.000	2.41	22.07	0.96
3.900	1.04	9.967	2.89	16.033	2.41	22.10	0.96
3.933	1.04	10.000	2.89	16.067	2.41	22.13	0.96
3.967	1.04	10.033	2.89	16.100	2.41	22.17	0.96
4.000	1.04	10.067	2.89	16.133	2.41	22.20	0.96
4.033	1.04	10.100	2.89	16.167	2.41	22.23	0.96
4.067	1.04	10.133	2.89	16.200	2.41	22.27	0.96
4.100	1.04	10.167	2.89	16.233	2.41	22.30	0.96
4.133	1.04	10.200	2.89	16.267	1.92	22.33	0.96
4.167	1.04	10.233	2.89	16.300	1.44	22.37	0.96
4.200	1.04	10.267	3.29	16.333	1.44	22.40	0.96
4.233	1.04	10.300	3.69	16.367	1.44	22.43	0.96
4.267	1.16	10.333	3.69	16.400	1.44	22.47	0.96
4.300	1.28	10.367	3.69	16.433	1.44	22.50	0.96
4.333	1.28	10.400	3.69	16.467	1.44	22.53	0.96
4.367	1.28	10.433	3.69	16.500	1.44	22.57	0.96
4.400	1.28	10.467	3.69	16.533	1.44	22.60	0.96
4.433	1.28	10.500	3.69	16.567	1.44	22.63	0.96
4.467	1.28	10.533	3.69	16.600	1.44	22.67	0.96
4.500	1.28	10.567	3.69	16.633	1.44	22.70	0.96
4.533	1.28	10.600	3.69	16.667	1.44	22.73	0.96
4.567	1.28	10.633	3.69	16.700	1.44	22.77	0.96
4.600	1.28	10.667	3.69	16.733	1.44	22.80	0.96
4.633	1.28	10.700	3.69	16.767	1.44	22.83	0.96
4.667	1.28	10.733	3.69	16.800	1.44	22.87	0.96

4.700	1.28	10.767	4.34	16.833	1.44	22.90	0.96
4.733	1.28	10.800	4.98	16.867	1.44	22.93	0.96
4.767	1.28	10.833	4.98	16.900	1.44	22.97	0.96
4.800	1.28	10.867	4.98	16.933	1.44	23.00	0.96
4.833	1.28	10.900	4.98	16.967	1.44	23.03	0.96
4.867	1.28	10.933	4.98	17.000	1.44	23.07	0.96
4.900	1.28	10.967	4.98	17.033	1.44	23.10	0.96
4.933	1.28	11.000	4.98	17.067	1.44	23.13	0.96
4.967	1.28	11.033	4.98	17.100	1.44	23.17	0.96
5.000	1.28	11.067	4.98	17.133	1.44	23.20	0.96
5.033	1.28	11.100	4.98	17.167	1.44	23.23	0.96
5.067	1.28	11.133	4.98	17.200	1.44	23.27	0.96
5.100	1.28	11.167	4.98	17.233	1.44	23.30	0.96
5.133	1.28	11.200	4.98	17.267	1.44	23.33	0.96
5.167	1.28	11.233	4.98	17.300	1.44	23.37	0.96
5.200	1.28	11.267	6.34	17.333	1.44	23.40	0.96
5.233	1.28	11.300	7.70	17.367	1.44	23.43	0.96
5.267	1.28	11.333	7.70	17.400	1.44	23.47	0.96
5.300	1.28	11.367	7.70	17.433	1.44	23.50	0.96
5.333	1.28	11.400	7.70	17.467	1.44	23.53	0.96
5.367	1.28	11.433	7.70	17.500	1.44	23.57	0.96
5.400	1.28	11.467	7.70	17.533	1.44	23.60	0.96
5.433	1.28	11.500	7.71	17.567	1.44	23.63	0.96
5.467	1.28	11.533	7.70	17.600	1.44	23.67	0.96
5.500	1.28	11.567	7.70	17.633	1.44	23.70	0.96
5.533	1.28	11.600	7.70	17.667	1.44	23.73	0.96
5.567	1.28	11.633	7.70	17.700	1.44	23.77	0.96
5.600	1.28	11.667	7.70	17.733	1.44	23.80	0.96
5.633	1.28	11.700	7.70	17.767	1.44	23.83	0.96
5.667	1.28	11.733	7.70	17.800	1.44	23.87	0.96
5.700	1.28	11.767	15.75	17.833	1.44	23.90	0.96
5.733	1.28	11.800	23.76	17.867	1.44	23.93	0.96
5.767	1.28	11.833	23.76	17.900	1.44	23.97	0.96
5.800	1.28	11.867	23.76	17.933	1.44	24.00	0.96
5.833	1.28	11.900	23.76	17.967	1.44	24.03	0.96
5.867	1.28	11.933	23.76	18.000	1.44	24.07	0.96
5.900	1.28	11.967	23.76	18.033	1.44	24.10	0.96
5.933	1.28	12.000	23.86	18.067	1.44	24.13	0.96
5.967	1.28	12.033	98.24	18.100	1.44	24.17	0.96
6.000	1.28	12.067	98.24	18.133	1.44	24.20	0.96
6.033	1.28	12.100	98.24	18.167	1.44	24.23	0.96
6.067	1.28	12.133	98.24	18.200	1.44	24.27	0.48

Max.Eff.Inten.(mm/hr)=	98.24	30.91	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.17 (ii)	5.66 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.49	0.19	
			TOTALS

PEAK FLOW (cms)=	0.02	0.00	0.025 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	78.26	21.85	64.71
TOTAL RAINFALL (mm)=	80.26	80.26	80.26
RUNOFF COEFFICIENT =	0.98	0.27	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
```

Developed and Distributed by Smart City Water Inc

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\7986da01-1b88-4cfb-9db7-afc223c267c6\sc

Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\7986da01-1b88-4cfb-9db7-afc223c267c6\sc

DATE: 01-16-2026 TIME: 04:30:13

USER:

COMMENTS: _____

**** SIMULATION : 24hr SCS 2yr ****

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\56b3036e-ed23-4339-a443-7ff2161d9767\56d23be4
Ptotal= 51.98 mm	Comments: 24hr SCS 2yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	0.94	12.50	7.49	18.75	0.94
0.25	0.57	6.50	0.94	12.75	3.85	19.00	0.94
0.50	0.57	6.75	0.94	13.00	3.85	19.25	0.94
0.75	0.57	7.00	0.94	13.25	2.81	19.50	0.94
1.00	0.57	7.25	1.14	13.50	2.81	19.75	0.94
1.25	0.57	7.50	1.14	13.75	2.18	20.00	0.94
1.50	0.57	7.75	1.14	14.00	2.18	20.25	0.62
1.75	0.57	8.00	1.14	14.25	1.56	20.50	0.62
2.00	0.57	8.25	1.35	14.50	1.56	20.75	0.62
2.25	0.68	8.50	1.35	14.75	1.56	21.00	0.62
2.50	0.68	8.75	1.46	15.00	1.56	21.25	0.62
2.75	0.68	9.00	1.46	15.25	1.56	21.50	0.62
3.00	0.68	9.25	1.66	15.50	1.56	21.75	0.62
3.25	0.68	9.50	1.66	15.75	1.56	22.00	0.62
3.50	0.68	9.75	1.87	16.00	1.56	22.25	0.62
3.75	0.68	10.00	1.87	16.25	0.94	22.50	0.62
4.00	0.68	10.25	2.39	16.50	0.94	22.75	0.62
4.25	0.83	10.50	2.39	16.75	0.94	23.00	0.62
4.50	0.83	10.75	3.22	17.00	0.94	23.25	0.62
4.75	0.83	11.00	3.22	17.25	0.94	23.50	0.62
5.00	0.83	11.25	4.99	17.50	0.94	23.75	0.62
5.25	0.83	11.50	4.99	17.75	0.94	24.00	0.62
5.50	0.83	11.75	15.39	18.00	0.94		
5.75	0.83	12.00	63.62	18.25	0.94		
6.00	0.83	12.25	7.49	18.50	0.94		

CALIB STANDHYD (0120) ID= 1 DT= 2.0 min	Area (ha)= 0.11 Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.83	12.167	63.62	18.23	0.94
0.067	0.00	6.133	0.83	12.200	63.62	18.27	0.94
0.100	0.00	6.167	0.83	12.233	63.62	18.30	0.94
0.133	0.00	6.200	0.83	12.267	35.47	18.33	0.94
0.167	0.00	6.233	0.83	12.300	7.49	18.37	0.94
0.200	0.00	6.267	0.88	12.333	7.49	18.40	0.94
0.233	0.00	6.300	0.94	12.367	7.49	18.43	0.94
0.267	0.29	6.333	0.94	12.400	7.49	18.47	0.94
0.300	0.57	6.367	0.94	12.433	7.49	18.50	0.94
0.333	0.57	6.400	0.94	12.467	7.49	18.53	0.94
0.367	0.57	6.433	0.94	12.500	7.49	18.57	0.94
0.400	0.57	6.467	0.94	12.533	7.49	18.60	0.94
0.433	0.57	6.500	0.94	12.567	7.49	18.63	0.94
0.467	0.57	6.533	0.94	12.600	7.49	18.67	0.94
0.500	0.57	6.567	0.94	12.633	7.49	18.70	0.94
0.533	0.57	6.600	0.94	12.667	7.49	18.73	0.94
0.567	0.57	6.633	0.94	12.700	7.49	18.77	0.94
0.600	0.57	6.667	0.94	12.733	7.49	18.80	0.94
0.633	0.57	6.700	0.94	12.767	5.66	18.83	0.94
0.667	0.57	6.733	0.94	12.800	3.85	18.87	0.94
0.700	0.57	6.767	0.94	12.833	3.85	18.90	0.94
0.733	0.57	6.800	0.94	12.867	3.85	18.93	0.94
0.767	0.57	6.833	0.94	12.900	3.85	18.97	0.94
0.800	0.57	6.867	0.94	12.933	3.85	19.00	0.94
0.833	0.57	6.900	0.94	12.967	3.85	19.03	0.94
0.867	0.57	6.933	0.94	13.000	3.85	19.07	0.94
0.900	0.57	6.967	0.94	13.033	3.85	19.10	0.94
0.933	0.57	7.000	0.94	13.067	3.85	19.13	0.94
0.967	0.57	7.033	0.94	13.100	3.85	19.17	0.94
1.000	0.57	7.067	0.94	13.133	3.85	19.20	0.94
1.033	0.57	7.100	0.94	13.167	3.85	19.23	0.94

1.067	0.57	7.133	0.94	13.200	3.85	19.27	0.94
1.100	0.57	7.167	0.94	13.233	3.85	19.30	0.94
1.133	0.57	7.200	0.94	13.267	3.32	19.33	0.94
1.167	0.57	7.233	0.94	13.300	2.81	19.37	0.94
1.200	0.57	7.267	1.04	13.333	2.81	19.40	0.94
1.233	0.57	7.300	1.14	13.367	2.81	19.43	0.94
1.267	0.57	7.333	1.14	13.400	2.81	19.47	0.94
1.300	0.57	7.367	1.14	13.433	2.81	19.50	0.94
1.333	0.57	7.400	1.14	13.467	2.81	19.53	0.94
1.367	0.57	7.433	1.14	13.500	2.81	19.57	0.94
1.400	0.57	7.467	1.14	13.533	2.81	19.60	0.94
1.433	0.57	7.500	1.14	13.567	2.81	19.63	0.94
1.467	0.57	7.533	1.14	13.600	2.81	19.67	0.94
1.500	0.57	7.567	1.14	13.633	2.81	19.70	0.94
1.533	0.57	7.600	1.14	13.667	2.81	19.73	0.94
1.567	0.57	7.633	1.14	13.700	2.81	19.77	0.94
1.600	0.57	7.667	1.14	13.733	2.81	19.80	0.94
1.633	0.57	7.700	1.14	13.767	2.49	19.83	0.94
1.667	0.57	7.733	1.14	13.800	2.18	19.87	0.94
1.700	0.57	7.767	1.14	13.833	2.18	19.90	0.94
1.733	0.57	7.800	1.14	13.867	2.18	19.93	0.94
1.767	0.57	7.833	1.14	13.900	2.18	19.97	0.94
1.800	0.57	7.867	1.14	13.933	2.18	20.00	0.94
1.833	0.57	7.900	1.14	13.967	2.18	20.03	0.94
1.867	0.57	7.933	1.14	14.000	2.18	20.07	0.94
1.900	0.57	7.967	1.14	14.033	2.18	20.10	0.94
1.933	0.57	8.000	1.14	14.067	2.18	20.13	0.94
1.967	0.57	8.033	1.14	14.100	2.18	20.17	0.94
2.000	0.57	8.067	1.14	14.133	2.18	20.20	0.94
2.033	0.57	8.100	1.14	14.167	2.18	20.23	0.94
2.067	0.57	8.133	1.14	14.200	2.18	20.27	0.78
2.100	0.57	8.167	1.14	14.233	2.18	20.30	0.62
2.133	0.57	8.200	1.14	14.267	1.87	20.33	0.62
2.167	0.57	8.233	1.14	14.300	1.56	20.37	0.62
2.200	0.57	8.267	1.25	14.333	1.56	20.40	0.62
2.233	0.57	8.300	1.35	14.367	1.56	20.43	0.62
2.267	0.62	8.333	1.35	14.400	1.56	20.47	0.62
2.300	0.68	8.367	1.35	14.433	1.56	20.50	0.62
2.333	0.68	8.400	1.35	14.467	1.56	20.53	0.62
2.367	0.68	8.433	1.35	14.500	1.56	20.57	0.62
2.400	0.68	8.467	1.35	14.533	1.56	20.60	0.62
2.433	0.68	8.500	1.35	14.567	1.56	20.63	0.62
2.467	0.68	8.533	1.35	14.600	1.56	20.67	0.62
2.500	0.68	8.567	1.35	14.633	1.56	20.70	0.62
2.533	0.68	8.600	1.35	14.667	1.56	20.73	0.62
2.567	0.68	8.633	1.35	14.700	1.56	20.77	0.62
2.600	0.68	8.667	1.35	14.733	1.56	20.80	0.62
2.633	0.68	8.700	1.35	14.767	1.56	20.83	0.62
2.667	0.68	8.733	1.35	14.800	1.56	20.87	0.62

2.700	0.68	8.767	1.40	14.833	1.56	20.90	0.62
2.733	0.68	8.800	1.46	14.867	1.56	20.93	0.62
2.767	0.68	8.833	1.46	14.900	1.56	20.97	0.62
2.800	0.68	8.867	1.46	14.933	1.56	21.00	0.62
2.833	0.68	8.900	1.46	14.967	1.56	21.03	0.62
2.867	0.68	8.933	1.46	15.000	1.56	21.07	0.62
2.900	0.68	8.967	1.46	15.033	1.56	21.10	0.62
2.933	0.68	9.000	1.46	15.067	1.56	21.13	0.62
2.967	0.68	9.033	1.46	15.100	1.56	21.17	0.62
3.000	0.68	9.067	1.46	15.133	1.56	21.20	0.62
3.033	0.68	9.100	1.46	15.167	1.56	21.23	0.62
3.067	0.68	9.133	1.46	15.200	1.56	21.27	0.62
3.100	0.68	9.167	1.46	15.233	1.56	21.30	0.62
3.133	0.68	9.200	1.46	15.267	1.56	21.33	0.62
3.167	0.68	9.233	1.46	15.300	1.56	21.37	0.62
3.200	0.68	9.267	1.56	15.333	1.56	21.40	0.62
3.233	0.68	9.300	1.66	15.367	1.56	21.43	0.62
3.267	0.68	9.333	1.66	15.400	1.56	21.47	0.62
3.300	0.68	9.367	1.66	15.433	1.56	21.50	0.62
3.333	0.68	9.400	1.66	15.467	1.56	21.53	0.62
3.367	0.68	9.433	1.66	15.500	1.56	21.57	0.62
3.400	0.68	9.467	1.66	15.533	1.56	21.60	0.62
3.433	0.68	9.500	1.66	15.567	1.56	21.63	0.62
3.467	0.68	9.533	1.66	15.600	1.56	21.67	0.62
3.500	0.68	9.567	1.66	15.633	1.56	21.70	0.62
3.533	0.68	9.600	1.66	15.667	1.56	21.73	0.62
3.567	0.68	9.633	1.66	15.700	1.56	21.77	0.62
3.600	0.68	9.667	1.66	15.733	1.56	21.80	0.62
3.633	0.68	9.700	1.66	15.767	1.56	21.83	0.62
3.667	0.68	9.733	1.66	15.800	1.56	21.87	0.62
3.700	0.68	9.767	1.77	15.833	1.56	21.90	0.62
3.733	0.68	9.800	1.87	15.867	1.56	21.93	0.62
3.767	0.68	9.833	1.87	15.900	1.56	21.97	0.62
3.800	0.68	9.867	1.87	15.933	1.56	22.00	0.62
3.833	0.68	9.900	1.87	15.967	1.56	22.03	0.62
3.867	0.68	9.933	1.87	16.000	1.56	22.07	0.62
3.900	0.68	9.967	1.87	16.033	1.56	22.10	0.62
3.933	0.68	10.000	1.87	16.067	1.56	22.13	0.62
3.967	0.68	10.033	1.87	16.100	1.56	22.17	0.62
4.000	0.68	10.067	1.87	16.133	1.56	22.20	0.62
4.033	0.68	10.100	1.87	16.167	1.56	22.23	0.62
4.067	0.68	10.133	1.87	16.200	1.56	22.27	0.62
4.100	0.68	10.167	1.87	16.233	1.56	22.30	0.62
4.133	0.68	10.200	1.87	16.267	1.25	22.33	0.62
4.167	0.68	10.233	1.87	16.300	0.94	22.37	0.62
4.200	0.68	10.267	2.13	16.333	0.94	22.40	0.62
4.233	0.68	10.300	2.39	16.367	0.94	22.43	0.62
4.267	0.75	10.333	2.39	16.400	0.94	22.47	0.62
4.300	0.83	10.367	2.39	16.433	0.94	22.50	0.62

4.333	0.83	10.400	2.39	16.467	0.94	22.53	0.62
4.367	0.83	10.433	2.39	16.500	0.94	22.57	0.62
4.400	0.83	10.467	2.39	16.533	0.94	22.60	0.62
4.433	0.83	10.500	2.39	16.567	0.94	22.63	0.62
4.467	0.83	10.533	2.39	16.600	0.94	22.67	0.62
4.500	0.83	10.567	2.39	16.633	0.94	22.70	0.62
4.533	0.83	10.600	2.39	16.667	0.94	22.73	0.62
4.567	0.83	10.633	2.39	16.700	0.94	22.77	0.62
4.600	0.83	10.667	2.39	16.733	0.94	22.80	0.62
4.633	0.83	10.700	2.39	16.767	0.94	22.83	0.62
4.667	0.83	10.733	2.39	16.800	0.94	22.87	0.62
4.700	0.83	10.767	2.81	16.833	0.94	22.90	0.62
4.733	0.83	10.800	3.22	16.867	0.94	22.93	0.62
4.767	0.83	10.833	3.22	16.900	0.94	22.97	0.62
4.800	0.83	10.867	3.22	16.933	0.94	23.00	0.62
4.833	0.83	10.900	3.22	16.967	0.94	23.03	0.62
4.867	0.83	10.933	3.22	17.000	0.94	23.07	0.62
4.900	0.83	10.967	3.22	17.033	0.94	23.10	0.62
4.933	0.83	11.000	3.22	17.067	0.94	23.13	0.62
4.967	0.83	11.033	3.22	17.100	0.94	23.17	0.62
5.000	0.83	11.067	3.22	17.133	0.94	23.20	0.62
5.033	0.83	11.100	3.22	17.167	0.94	23.23	0.62
5.067	0.83	11.133	3.22	17.200	0.94	23.27	0.62
5.100	0.83	11.167	3.22	17.233	0.94	23.30	0.62
5.133	0.83	11.200	3.22	17.267	0.94	23.33	0.62
5.167	0.83	11.233	3.22	17.300	0.94	23.37	0.62
5.200	0.83	11.267	4.11	17.333	0.94	23.40	0.62
5.233	0.83	11.300	4.99	17.367	0.94	23.43	0.62
5.267	0.83	11.333	4.99	17.400	0.94	23.47	0.62
5.300	0.83	11.367	4.99	17.433	0.94	23.50	0.62
5.333	0.83	11.400	4.99	17.467	0.94	23.53	0.62
5.367	0.83	11.433	4.99	17.500	0.94	23.57	0.62
5.400	0.83	11.467	4.99	17.533	0.94	23.60	0.62
5.433	0.83	11.500	4.99	17.567	0.94	23.63	0.62
5.467	0.83	11.533	4.99	17.600	0.94	23.67	0.62
5.500	0.83	11.567	4.99	17.633	0.94	23.70	0.62
5.533	0.83	11.600	4.99	17.667	0.94	23.73	0.62
5.567	0.83	11.633	4.99	17.700	0.94	23.77	0.62
5.600	0.83	11.667	4.99	17.733	0.94	23.80	0.62
5.633	0.83	11.700	4.99	17.767	0.94	23.83	0.62
5.667	0.83	11.733	4.99	17.800	0.94	23.87	0.62
5.700	0.83	11.767	10.20	17.833	0.94	23.90	0.62
5.733	0.83	11.800	15.39	17.867	0.94	23.93	0.62
5.767	0.83	11.833	15.39	17.900	0.94	23.97	0.62
5.800	0.83	11.867	15.39	17.933	0.94	24.00	0.62
5.833	0.83	11.900	15.39	17.967	0.94	24.03	0.62
5.867	0.83	11.933	15.39	18.000	0.94	24.07	0.62
5.900	0.83	11.967	15.39	18.033	0.94	24.10	0.62
5.933	0.83	12.000	15.45	18.067	0.94	24.13	0.62

5.967	0.83	12.033	63.62	18.100	0.94	24.17	0.62
6.000	0.83	12.067	63.62	18.133	0.94	24.20	0.62
6.033	0.83	12.100	63.62	18.167	0.94	24.23	0.62
6.067	0.83	12.133	63.62	18.200	0.94	24.27	0.31

Max.Eff.Inten.(mm/hr)=	63.62	20.99	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.40 (ii)	6.61 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.16	
			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.016 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	49.98	14.64	41.83
TOTAL RAINFALL (mm)=	51.98	51.98	51.98
RUNOFF COEFFICIENT =	0.96	0.28	0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0110)	Area (ha)= 0.71
ID= 1 DT= 2.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.83	12.167	63.62	18.23	0.94
0.067	0.00	6.133	0.83	12.200	63.62	18.27	0.94
0.100	0.00	6.167	0.83	12.233	63.62	18.30	0.94
0.133	0.00	6.200	0.83	12.267	35.47	18.33	0.94
0.167	0.00	6.233	0.83	12.300	7.49	18.37	0.94

0.200	0.00	6.267	0.88	12.333	7.49	18.40	0.94
0.233	0.00	6.300	0.94	12.367	7.49	18.43	0.94
0.267	0.29	6.333	0.94	12.400	7.49	18.47	0.94
0.300	0.57	6.367	0.94	12.433	7.49	18.50	0.94
0.333	0.57	6.400	0.94	12.467	7.49	18.53	0.94
0.367	0.57	6.433	0.94	12.500	7.49	18.57	0.94
0.400	0.57	6.467	0.94	12.533	7.49	18.60	0.94
0.433	0.57	6.500	0.94	12.567	7.49	18.63	0.94
0.467	0.57	6.533	0.94	12.600	7.49	18.67	0.94
0.500	0.57	6.567	0.94	12.633	7.49	18.70	0.94
0.533	0.57	6.600	0.94	12.667	7.49	18.73	0.94
0.567	0.57	6.633	0.94	12.700	7.49	18.77	0.94
0.600	0.57	6.667	0.94	12.733	7.49	18.80	0.94
0.633	0.57	6.700	0.94	12.767	5.66	18.83	0.94
0.667	0.57	6.733	0.94	12.800	3.85	18.87	0.94
0.700	0.57	6.767	0.94	12.833	3.85	18.90	0.94
0.733	0.57	6.800	0.94	12.867	3.85	18.93	0.94
0.767	0.57	6.833	0.94	12.900	3.85	18.97	0.94
0.800	0.57	6.867	0.94	12.933	3.85	19.00	0.94
0.833	0.57	6.900	0.94	12.967	3.85	19.03	0.94
0.867	0.57	6.933	0.94	13.000	3.85	19.07	0.94
0.900	0.57	6.967	0.94	13.033	3.85	19.10	0.94
0.933	0.57	7.000	0.94	13.067	3.85	19.13	0.94
0.967	0.57	7.033	0.94	13.100	3.85	19.17	0.94
1.000	0.57	7.067	0.94	13.133	3.85	19.20	0.94
1.033	0.57	7.100	0.94	13.167	3.85	19.23	0.94
1.067	0.57	7.133	0.94	13.200	3.85	19.27	0.94
1.100	0.57	7.167	0.94	13.233	3.85	19.30	0.94
1.133	0.57	7.200	0.94	13.267	3.32	19.33	0.94
1.167	0.57	7.233	0.94	13.300	2.81	19.37	0.94
1.200	0.57	7.267	1.04	13.333	2.81	19.40	0.94
1.233	0.57	7.300	1.14	13.367	2.81	19.43	0.94
1.267	0.57	7.333	1.14	13.400	2.81	19.47	0.94
1.300	0.57	7.367	1.14	13.433	2.81	19.50	0.94
1.333	0.57	7.400	1.14	13.467	2.81	19.53	0.94
1.367	0.57	7.433	1.14	13.500	2.81	19.57	0.94
1.400	0.57	7.467	1.14	13.533	2.81	19.60	0.94
1.433	0.57	7.500	1.14	13.567	2.81	19.63	0.94
1.467	0.57	7.533	1.14	13.600	2.81	19.67	0.94
1.500	0.57	7.567	1.14	13.633	2.81	19.70	0.94
1.533	0.57	7.600	1.14	13.667	2.81	19.73	0.94
1.567	0.57	7.633	1.14	13.700	2.81	19.77	0.94
1.600	0.57	7.667	1.14	13.733	2.81	19.80	0.94
1.633	0.57	7.700	1.14	13.767	2.49	19.83	0.94
1.667	0.57	7.733	1.14	13.800	2.18	19.87	0.94
1.700	0.57	7.767	1.14	13.833	2.18	19.90	0.94
1.733	0.57	7.800	1.14	13.867	2.18	19.93	0.94
1.767	0.57	7.833	1.14	13.900	2.18	19.97	0.94
1.800	0.57	7.867	1.14	13.933	2.18	20.00	0.94

1.833	0.57	7.900	1.14	13.967	2.18	20.03	0.94
1.867	0.57	7.933	1.14	14.000	2.18	20.07	0.94
1.900	0.57	7.967	1.14	14.033	2.18	20.10	0.94
1.933	0.57	8.000	1.14	14.067	2.18	20.13	0.94
1.967	0.57	8.033	1.14	14.100	2.18	20.17	0.94
2.000	0.57	8.067	1.14	14.133	2.18	20.20	0.94
2.033	0.57	8.100	1.14	14.167	2.18	20.23	0.94
2.067	0.57	8.133	1.14	14.200	2.18	20.27	0.78
2.100	0.57	8.167	1.14	14.233	2.18	20.30	0.62
2.133	0.57	8.200	1.14	14.267	1.87	20.33	0.62
2.167	0.57	8.233	1.14	14.300	1.56	20.37	0.62
2.200	0.57	8.267	1.25	14.333	1.56	20.40	0.62
2.233	0.57	8.300	1.35	14.367	1.56	20.43	0.62
2.267	0.62	8.333	1.35	14.400	1.56	20.47	0.62
2.300	0.68	8.367	1.35	14.433	1.56	20.50	0.62
2.333	0.68	8.400	1.35	14.467	1.56	20.53	0.62
2.367	0.68	8.433	1.35	14.500	1.56	20.57	0.62
2.400	0.68	8.467	1.35	14.533	1.56	20.60	0.62
2.433	0.68	8.500	1.35	14.567	1.56	20.63	0.62
2.467	0.68	8.533	1.35	14.600	1.56	20.67	0.62
2.500	0.68	8.567	1.35	14.633	1.56	20.70	0.62
2.533	0.68	8.600	1.35	14.667	1.56	20.73	0.62
2.567	0.68	8.633	1.35	14.700	1.56	20.77	0.62
2.600	0.68	8.667	1.35	14.733	1.56	20.80	0.62
2.633	0.68	8.700	1.35	14.767	1.56	20.83	0.62
2.667	0.68	8.733	1.35	14.800	1.56	20.87	0.62
2.700	0.68	8.767	1.40	14.833	1.56	20.90	0.62
2.733	0.68	8.800	1.46	14.867	1.56	20.93	0.62
2.767	0.68	8.833	1.46	14.900	1.56	20.97	0.62
2.800	0.68	8.867	1.46	14.933	1.56	21.00	0.62
2.833	0.68	8.900	1.46	14.967	1.56	21.03	0.62
2.867	0.68	8.933	1.46	15.000	1.56	21.07	0.62
2.900	0.68	8.967	1.46	15.033	1.56	21.10	0.62
2.933	0.68	9.000	1.46	15.067	1.56	21.13	0.62
2.967	0.68	9.033	1.46	15.100	1.56	21.17	0.62
3.000	0.68	9.067	1.46	15.133	1.56	21.20	0.62
3.033	0.68	9.100	1.46	15.167	1.56	21.23	0.62
3.067	0.68	9.133	1.46	15.200	1.56	21.27	0.62
3.100	0.68	9.167	1.46	15.233	1.56	21.30	0.62
3.133	0.68	9.200	1.46	15.267	1.56	21.33	0.62
3.167	0.68	9.233	1.46	15.300	1.56	21.37	0.62
3.200	0.68	9.267	1.56	15.333	1.56	21.40	0.62
3.233	0.68	9.300	1.66	15.367	1.56	21.43	0.62
3.267	0.68	9.333	1.66	15.400	1.56	21.47	0.62
3.300	0.68	9.367	1.66	15.433	1.56	21.50	0.62
3.333	0.68	9.400	1.66	15.467	1.56	21.53	0.62
3.367	0.68	9.433	1.66	15.500	1.56	21.57	0.62
3.400	0.68	9.467	1.66	15.533	1.56	21.60	0.62
3.433	0.68	9.500	1.66	15.567	1.56	21.63	0.62

3.467	0.68	9.533	1.66	15.600	1.56	21.67	0.62
3.500	0.68	9.567	1.66	15.633	1.56	21.70	0.62
3.533	0.68	9.600	1.66	15.667	1.56	21.73	0.62
3.567	0.68	9.633	1.66	15.700	1.56	21.77	0.62
3.600	0.68	9.667	1.66	15.733	1.56	21.80	0.62
3.633	0.68	9.700	1.66	15.767	1.56	21.83	0.62
3.667	0.68	9.733	1.66	15.800	1.56	21.87	0.62
3.700	0.68	9.767	1.77	15.833	1.56	21.90	0.62
3.733	0.68	9.800	1.87	15.867	1.56	21.93	0.62
3.767	0.68	9.833	1.87	15.900	1.56	21.97	0.62
3.800	0.68	9.867	1.87	15.933	1.56	22.00	0.62
3.833	0.68	9.900	1.87	15.967	1.56	22.03	0.62
3.867	0.68	9.933	1.87	16.000	1.56	22.07	0.62
3.900	0.68	9.967	1.87	16.033	1.56	22.10	0.62
3.933	0.68	10.000	1.87	16.067	1.56	22.13	0.62
3.967	0.68	10.033	1.87	16.100	1.56	22.17	0.62
4.000	0.68	10.067	1.87	16.133	1.56	22.20	0.62
4.033	0.68	10.100	1.87	16.167	1.56	22.23	0.62
4.067	0.68	10.133	1.87	16.200	1.56	22.27	0.62
4.100	0.68	10.167	1.87	16.233	1.56	22.30	0.62
4.133	0.68	10.200	1.87	16.267	1.25	22.33	0.62
4.167	0.68	10.233	1.87	16.300	0.94	22.37	0.62
4.200	0.68	10.267	2.13	16.333	0.94	22.40	0.62
4.233	0.68	10.300	2.39	16.367	0.94	22.43	0.62
4.267	0.75	10.333	2.39	16.400	0.94	22.47	0.62
4.300	0.83	10.367	2.39	16.433	0.94	22.50	0.62
4.333	0.83	10.400	2.39	16.467	0.94	22.53	0.62
4.367	0.83	10.433	2.39	16.500	0.94	22.57	0.62
4.400	0.83	10.467	2.39	16.533	0.94	22.60	0.62
4.433	0.83	10.500	2.39	16.567	0.94	22.63	0.62
4.467	0.83	10.533	2.39	16.600	0.94	22.67	0.62
4.500	0.83	10.567	2.39	16.633	0.94	22.70	0.62
4.533	0.83	10.600	2.39	16.667	0.94	22.73	0.62
4.567	0.83	10.633	2.39	16.700	0.94	22.77	0.62
4.600	0.83	10.667	2.39	16.733	0.94	22.80	0.62
4.633	0.83	10.700	2.39	16.767	0.94	22.83	0.62
4.667	0.83	10.733	2.39	16.800	0.94	22.87	0.62
4.700	0.83	10.767	2.81	16.833	0.94	22.90	0.62
4.733	0.83	10.800	3.22	16.867	0.94	22.93	0.62
4.767	0.83	10.833	3.22	16.900	0.94	22.97	0.62
4.800	0.83	10.867	3.22	16.933	0.94	23.00	0.62
4.833	0.83	10.900	3.22	16.967	0.94	23.03	0.62
4.867	0.83	10.933	3.22	17.000	0.94	23.07	0.62
4.900	0.83	10.967	3.22	17.033	0.94	23.10	0.62
4.933	0.83	11.000	3.22	17.067	0.94	23.13	0.62
4.967	0.83	11.033	3.22	17.100	0.94	23.17	0.62
5.000	0.83	11.067	3.22	17.133	0.94	23.20	0.62
5.033	0.83	11.100	3.22	17.167	0.94	23.23	0.62
5.067	0.83	11.133	3.22	17.200	0.94	23.27	0.62

5.100	0.83	11.167	3.22	17.233	0.94	23.30	0.62
5.133	0.83	11.200	3.22	17.267	0.94	23.33	0.62
5.167	0.83	11.233	3.22	17.300	0.94	23.37	0.62
5.200	0.83	11.267	4.11	17.333	0.94	23.40	0.62
5.233	0.83	11.300	4.99	17.367	0.94	23.43	0.62
5.267	0.83	11.333	4.99	17.400	0.94	23.47	0.62
5.300	0.83	11.367	4.99	17.433	0.94	23.50	0.62
5.333	0.83	11.400	4.99	17.467	0.94	23.53	0.62
5.367	0.83	11.433	4.99	17.500	0.94	23.57	0.62
5.400	0.83	11.467	4.99	17.533	0.94	23.60	0.62
5.433	0.83	11.500	4.99	17.567	0.94	23.63	0.62
5.467	0.83	11.533	4.99	17.600	0.94	23.67	0.62
5.500	0.83	11.567	4.99	17.633	0.94	23.70	0.62
5.533	0.83	11.600	4.99	17.667	0.94	23.73	0.62
5.567	0.83	11.633	4.99	17.700	0.94	23.77	0.62
5.600	0.83	11.667	4.99	17.733	0.94	23.80	0.62
5.633	0.83	11.700	4.99	17.767	0.94	23.83	0.62
5.667	0.83	11.733	4.99	17.800	0.94	23.87	0.62
5.700	0.83	11.767	10.20	17.833	0.94	23.90	0.62
5.733	0.83	11.800	15.39	17.867	0.94	23.93	0.62
5.767	0.83	11.833	15.39	17.900	0.94	23.97	0.62
5.800	0.83	11.867	15.39	17.933	0.94	24.00	0.62
5.833	0.83	11.900	15.39	17.967	0.94	24.03	0.62
5.867	0.83	11.933	15.39	18.000	0.94	24.07	0.62
5.900	0.83	11.967	15.39	18.033	0.94	24.10	0.62
5.933	0.83	12.000	15.45	18.067	0.94	24.13	0.62
5.967	0.83	12.033	63.62	18.100	0.94	24.17	0.62
6.000	0.83	12.067	63.62	18.133	0.94	24.20	0.62
6.033	0.83	12.100	63.62	18.167	0.94	24.23	0.62
6.067	0.83	12.133	63.62	18.200	0.94	24.27	0.31

Max.Eff.Inten.(mm/hr)=	63.62	19.45	
over (min)	5.00	18.00	
Storage Coeff. (min)=	2.45 (ii)	16.03 (ii)	
Unit Hyd. Tpeak (min)=	4.00	18.00	
Unit Hyd. peak (cms)=	0.37	0.07	
			TOTALS
PEAK FLOW (cms)=	0.04	0.01	0.053 (iii)
TIME TO PEAK (hrs)=	12.23	12.43	12.23
RUNOFF VOLUME (mm)=	49.98	14.64	27.35
TOTAL RAINFALL (mm)=	51.98	51.98	51.98
RUNOFF COEFFICIENT =	0.96	0.28	0.53

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0110):	0.71	0.053	12.23	27.35
	+ ID2= 2 (0120):	0.11	0.016	12.23	41.83
	ID = 3 (0122):	0.82	0.069	12.23	29.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0150)	Area (ha)= 0.31		
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00	Dir. Conn.(%)= 54.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.83	12.167	63.62	18.23	0.94
0.067	0.00	6.133	0.83	12.200	63.62	18.27	0.94
0.100	0.00	6.167	0.83	12.233	63.62	18.30	0.94
0.133	0.00	6.200	0.83	12.267	35.47	18.33	0.94
0.167	0.00	6.233	0.83	12.300	7.49	18.37	0.94
0.200	0.00	6.267	0.88	12.333	7.49	18.40	0.94
0.233	0.00	6.300	0.94	12.367	7.49	18.43	0.94
0.267	0.29	6.333	0.94	12.400	7.49	18.47	0.94
0.300	0.57	6.367	0.94	12.433	7.49	18.50	0.94
0.333	0.57	6.400	0.94	12.467	7.49	18.53	0.94
0.367	0.57	6.433	0.94	12.500	7.49	18.57	0.94
0.400	0.57	6.467	0.94	12.533	7.49	18.60	0.94
0.433	0.57	6.500	0.94	12.567	7.49	18.63	0.94
0.467	0.57	6.533	0.94	12.600	7.49	18.67	0.94
0.500	0.57	6.567	0.94	12.633	7.49	18.70	0.94
0.533	0.57	6.600	0.94	12.667	7.49	18.73	0.94
0.567	0.57	6.633	0.94	12.700	7.49	18.77	0.94

0.600	0.57	6.667	0.94	12.733	7.49	18.80	0.94
0.633	0.57	6.700	0.94	12.767	5.66	18.83	0.94
0.667	0.57	6.733	0.94	12.800	3.85	18.87	0.94
0.700	0.57	6.767	0.94	12.833	3.85	18.90	0.94
0.733	0.57	6.800	0.94	12.867	3.85	18.93	0.94
0.767	0.57	6.833	0.94	12.900	3.85	18.97	0.94
0.800	0.57	6.867	0.94	12.933	3.85	19.00	0.94
0.833	0.57	6.900	0.94	12.967	3.85	19.03	0.94
0.867	0.57	6.933	0.94	13.000	3.85	19.07	0.94
0.900	0.57	6.967	0.94	13.033	3.85	19.10	0.94
0.933	0.57	7.000	0.94	13.067	3.85	19.13	0.94
0.967	0.57	7.033	0.94	13.100	3.85	19.17	0.94
1.000	0.57	7.067	0.94	13.133	3.85	19.20	0.94
1.033	0.57	7.100	0.94	13.167	3.85	19.23	0.94
1.067	0.57	7.133	0.94	13.200	3.85	19.27	0.94
1.100	0.57	7.167	0.94	13.233	3.85	19.30	0.94
1.133	0.57	7.200	0.94	13.267	3.32	19.33	0.94
1.167	0.57	7.233	0.94	13.300	2.81	19.37	0.94
1.200	0.57	7.267	1.04	13.333	2.81	19.40	0.94
1.233	0.57	7.300	1.14	13.367	2.81	19.43	0.94
1.267	0.57	7.333	1.14	13.400	2.81	19.47	0.94
1.300	0.57	7.367	1.14	13.433	2.81	19.50	0.94
1.333	0.57	7.400	1.14	13.467	2.81	19.53	0.94
1.367	0.57	7.433	1.14	13.500	2.81	19.57	0.94
1.400	0.57	7.467	1.14	13.533	2.81	19.60	0.94
1.433	0.57	7.500	1.14	13.567	2.81	19.63	0.94
1.467	0.57	7.533	1.14	13.600	2.81	19.67	0.94
1.500	0.57	7.567	1.14	13.633	2.81	19.70	0.94
1.533	0.57	7.600	1.14	13.667	2.81	19.73	0.94
1.567	0.57	7.633	1.14	13.700	2.81	19.77	0.94
1.600	0.57	7.667	1.14	13.733	2.81	19.80	0.94
1.633	0.57	7.700	1.14	13.767	2.49	19.83	0.94
1.667	0.57	7.733	1.14	13.800	2.18	19.87	0.94
1.700	0.57	7.767	1.14	13.833	2.18	19.90	0.94
1.733	0.57	7.800	1.14	13.867	2.18	19.93	0.94
1.767	0.57	7.833	1.14	13.900	2.18	19.97	0.94
1.800	0.57	7.867	1.14	13.933	2.18	20.00	0.94
1.833	0.57	7.900	1.14	13.967	2.18	20.03	0.94
1.867	0.57	7.933	1.14	14.000	2.18	20.07	0.94
1.900	0.57	7.967	1.14	14.033	2.18	20.10	0.94
1.933	0.57	8.000	1.14	14.067	2.18	20.13	0.94
1.967	0.57	8.033	1.14	14.100	2.18	20.17	0.94
2.000	0.57	8.067	1.14	14.133	2.18	20.20	0.94
2.033	0.57	8.100	1.14	14.167	2.18	20.23	0.94
2.067	0.57	8.133	1.14	14.200	2.18	20.27	0.78
2.100	0.57	8.167	1.14	14.233	2.18	20.30	0.62
2.133	0.57	8.200	1.14	14.267	1.87	20.33	0.62
2.167	0.57	8.233	1.14	14.300	1.56	20.37	0.62
2.200	0.57	8.267	1.25	14.333	1.56	20.40	0.62

2.233	0.57	8.300	1.35	14.367	1.56	20.43	0.62
2.267	0.62	8.333	1.35	14.400	1.56	20.47	0.62
2.300	0.68	8.367	1.35	14.433	1.56	20.50	0.62
2.333	0.68	8.400	1.35	14.467	1.56	20.53	0.62
2.367	0.68	8.433	1.35	14.500	1.56	20.57	0.62
2.400	0.68	8.467	1.35	14.533	1.56	20.60	0.62
2.433	0.68	8.500	1.35	14.567	1.56	20.63	0.62
2.467	0.68	8.533	1.35	14.600	1.56	20.67	0.62
2.500	0.68	8.567	1.35	14.633	1.56	20.70	0.62
2.533	0.68	8.600	1.35	14.667	1.56	20.73	0.62
2.567	0.68	8.633	1.35	14.700	1.56	20.77	0.62
2.600	0.68	8.667	1.35	14.733	1.56	20.80	0.62
2.633	0.68	8.700	1.35	14.767	1.56	20.83	0.62
2.667	0.68	8.733	1.35	14.800	1.56	20.87	0.62
2.700	0.68	8.767	1.40	14.833	1.56	20.90	0.62
2.733	0.68	8.800	1.46	14.867	1.56	20.93	0.62
2.767	0.68	8.833	1.46	14.900	1.56	20.97	0.62
2.800	0.68	8.867	1.46	14.933	1.56	21.00	0.62
2.833	0.68	8.900	1.46	14.967	1.56	21.03	0.62
2.867	0.68	8.933	1.46	15.000	1.56	21.07	0.62
2.900	0.68	8.967	1.46	15.033	1.56	21.10	0.62
2.933	0.68	9.000	1.46	15.067	1.56	21.13	0.62
2.967	0.68	9.033	1.46	15.100	1.56	21.17	0.62
3.000	0.68	9.067	1.46	15.133	1.56	21.20	0.62
3.033	0.68	9.100	1.46	15.167	1.56	21.23	0.62
3.067	0.68	9.133	1.46	15.200	1.56	21.27	0.62
3.100	0.68	9.167	1.46	15.233	1.56	21.30	0.62
3.133	0.68	9.200	1.46	15.267	1.56	21.33	0.62
3.167	0.68	9.233	1.46	15.300	1.56	21.37	0.62
3.200	0.68	9.267	1.56	15.333	1.56	21.40	0.62
3.233	0.68	9.300	1.66	15.367	1.56	21.43	0.62
3.267	0.68	9.333	1.66	15.400	1.56	21.47	0.62
3.300	0.68	9.367	1.66	15.433	1.56	21.50	0.62
3.333	0.68	9.400	1.66	15.467	1.56	21.53	0.62
3.367	0.68	9.433	1.66	15.500	1.56	21.57	0.62
3.400	0.68	9.467	1.66	15.533	1.56	21.60	0.62
3.433	0.68	9.500	1.66	15.567	1.56	21.63	0.62
3.467	0.68	9.533	1.66	15.600	1.56	21.67	0.62
3.500	0.68	9.567	1.66	15.633	1.56	21.70	0.62
3.533	0.68	9.600	1.66	15.667	1.56	21.73	0.62
3.567	0.68	9.633	1.66	15.700	1.56	21.77	0.62
3.600	0.68	9.667	1.66	15.733	1.56	21.80	0.62
3.633	0.68	9.700	1.66	15.767	1.56	21.83	0.62
3.667	0.68	9.733	1.66	15.800	1.56	21.87	0.62
3.700	0.68	9.767	1.77	15.833	1.56	21.90	0.62
3.733	0.68	9.800	1.87	15.867	1.56	21.93	0.62
3.767	0.68	9.833	1.87	15.900	1.56	21.97	0.62
3.800	0.68	9.867	1.87	15.933	1.56	22.00	0.62
3.833	0.68	9.900	1.87	15.967	1.56	22.03	0.62

3.867	0.68	9.933	1.87	16.000	1.56	22.07	0.62
3.900	0.68	9.967	1.87	16.033	1.56	22.10	0.62
3.933	0.68	10.000	1.87	16.067	1.56	22.13	0.62
3.967	0.68	10.033	1.87	16.100	1.56	22.17	0.62
4.000	0.68	10.067	1.87	16.133	1.56	22.20	0.62
4.033	0.68	10.100	1.87	16.167	1.56	22.23	0.62
4.067	0.68	10.133	1.87	16.200	1.56	22.27	0.62
4.100	0.68	10.167	1.87	16.233	1.56	22.30	0.62
4.133	0.68	10.200	1.87	16.267	1.25	22.33	0.62
4.167	0.68	10.233	1.87	16.300	0.94	22.37	0.62
4.200	0.68	10.267	2.13	16.333	0.94	22.40	0.62
4.233	0.68	10.300	2.39	16.367	0.94	22.43	0.62
4.267	0.75	10.333	2.39	16.400	0.94	22.47	0.62
4.300	0.83	10.367	2.39	16.433	0.94	22.50	0.62
4.333	0.83	10.400	2.39	16.467	0.94	22.53	0.62
4.367	0.83	10.433	2.39	16.500	0.94	22.57	0.62
4.400	0.83	10.467	2.39	16.533	0.94	22.60	0.62
4.433	0.83	10.500	2.39	16.567	0.94	22.63	0.62
4.467	0.83	10.533	2.39	16.600	0.94	22.67	0.62
4.500	0.83	10.567	2.39	16.633	0.94	22.70	0.62
4.533	0.83	10.600	2.39	16.667	0.94	22.73	0.62
4.567	0.83	10.633	2.39	16.700	0.94	22.77	0.62
4.600	0.83	10.667	2.39	16.733	0.94	22.80	0.62
4.633	0.83	10.700	2.39	16.767	0.94	22.83	0.62
4.667	0.83	10.733	2.39	16.800	0.94	22.87	0.62
4.700	0.83	10.767	2.81	16.833	0.94	22.90	0.62
4.733	0.83	10.800	3.22	16.867	0.94	22.93	0.62
4.767	0.83	10.833	3.22	16.900	0.94	22.97	0.62
4.800	0.83	10.867	3.22	16.933	0.94	23.00	0.62
4.833	0.83	10.900	3.22	16.967	0.94	23.03	0.62
4.867	0.83	10.933	3.22	17.000	0.94	23.07	0.62
4.900	0.83	10.967	3.22	17.033	0.94	23.10	0.62
4.933	0.83	11.000	3.22	17.067	0.94	23.13	0.62
4.967	0.83	11.033	3.22	17.100	0.94	23.17	0.62
5.000	0.83	11.067	3.22	17.133	0.94	23.20	0.62
5.033	0.83	11.100	3.22	17.167	0.94	23.23	0.62
5.067	0.83	11.133	3.22	17.200	0.94	23.27	0.62
5.100	0.83	11.167	3.22	17.233	0.94	23.30	0.62
5.133	0.83	11.200	3.22	17.267	0.94	23.33	0.62
5.167	0.83	11.233	3.22	17.300	0.94	23.37	0.62
5.200	0.83	11.267	4.11	17.333	0.94	23.40	0.62
5.233	0.83	11.300	4.99	17.367	0.94	23.43	0.62
5.267	0.83	11.333	4.99	17.400	0.94	23.47	0.62
5.300	0.83	11.367	4.99	17.433	0.94	23.50	0.62
5.333	0.83	11.400	4.99	17.467	0.94	23.53	0.62
5.367	0.83	11.433	4.99	17.500	0.94	23.57	0.62
5.400	0.83	11.467	4.99	17.533	0.94	23.60	0.62
5.433	0.83	11.500	4.99	17.567	0.94	23.63	0.62
5.467	0.83	11.533	4.99	17.600	0.94	23.67	0.62

5.500	0.83	11.567	4.99	17.633	0.94	23.70	0.62
5.533	0.83	11.600	4.99	17.667	0.94	23.73	0.62
5.567	0.83	11.633	4.99	17.700	0.94	23.77	0.62
5.600	0.83	11.667	4.99	17.733	0.94	23.80	0.62
5.633	0.83	11.700	4.99	17.767	0.94	23.83	0.62
5.667	0.83	11.733	4.99	17.800	0.94	23.87	0.62
5.700	0.83	11.767	10.20	17.833	0.94	23.90	0.62
5.733	0.83	11.800	15.39	17.867	0.94	23.93	0.62
5.767	0.83	11.833	15.39	17.900	0.94	23.97	0.62
5.800	0.83	11.867	15.39	17.933	0.94	24.00	0.62
5.833	0.83	11.900	15.39	17.967	0.94	24.03	0.62
5.867	0.83	11.933	15.39	18.000	0.94	24.07	0.62
5.900	0.83	11.967	15.39	18.033	0.94	24.10	0.62
5.933	0.83	12.000	15.45	18.067	0.94	24.13	0.62
5.967	0.83	12.033	63.62	18.100	0.94	24.17	0.62
6.000	0.83	12.067	63.62	18.133	0.94	24.20	0.62
6.033	0.83	12.100	63.62	18.167	0.94	24.23	0.62
6.067	0.83	12.133	63.62	18.200	0.94	24.27	0.31

Max.Eff.Inten.(mm/hr)=	63.62	13.37	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.91 (ii)	9.84 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.42	0.11	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.033 (iii)
TIME TO PEAK (hrs)=	12.23	12.33	12.23
RUNOFF VOLUME (mm)=	49.98	9.56	31.37
TOTAL RAINFALL (mm)=	51.98	51.98	51.98
RUNOFF COEFFICIENT =	0.96	0.18	0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00

Length	(m)=	47.61 40.00
Mannings n	=	0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.83	12.167	63.62	18.23	0.94
0.067	0.00	6.133	0.83	12.200	63.62	18.27	0.94
0.100	0.00	6.167	0.83	12.233	63.62	18.30	0.94
0.133	0.00	6.200	0.83	12.267	35.47	18.33	0.94
0.167	0.00	6.233	0.83	12.300	7.49	18.37	0.94
0.200	0.00	6.267	0.88	12.333	7.49	18.40	0.94
0.233	0.00	6.300	0.94	12.367	7.49	18.43	0.94
0.267	0.29	6.333	0.94	12.400	7.49	18.47	0.94
0.300	0.57	6.367	0.94	12.433	7.49	18.50	0.94
0.333	0.57	6.400	0.94	12.467	7.49	18.53	0.94
0.367	0.57	6.433	0.94	12.500	7.49	18.57	0.94
0.400	0.57	6.467	0.94	12.533	7.49	18.60	0.94
0.433	0.57	6.500	0.94	12.567	7.49	18.63	0.94
0.467	0.57	6.533	0.94	12.600	7.49	18.67	0.94
0.500	0.57	6.567	0.94	12.633	7.49	18.70	0.94
0.533	0.57	6.600	0.94	12.667	7.49	18.73	0.94
0.567	0.57	6.633	0.94	12.700	7.49	18.77	0.94
0.600	0.57	6.667	0.94	12.733	7.49	18.80	0.94
0.633	0.57	6.700	0.94	12.767	5.66	18.83	0.94
0.667	0.57	6.733	0.94	12.800	3.85	18.87	0.94
0.700	0.57	6.767	0.94	12.833	3.85	18.90	0.94
0.733	0.57	6.800	0.94	12.867	3.85	18.93	0.94
0.767	0.57	6.833	0.94	12.900	3.85	18.97	0.94
0.800	0.57	6.867	0.94	12.933	3.85	19.00	0.94
0.833	0.57	6.900	0.94	12.967	3.85	19.03	0.94
0.867	0.57	6.933	0.94	13.000	3.85	19.07	0.94
0.900	0.57	6.967	0.94	13.033	3.85	19.10	0.94
0.933	0.57	7.000	0.94	13.067	3.85	19.13	0.94
0.967	0.57	7.033	0.94	13.100	3.85	19.17	0.94
1.000	0.57	7.067	0.94	13.133	3.85	19.20	0.94
1.033	0.57	7.100	0.94	13.167	3.85	19.23	0.94
1.067	0.57	7.133	0.94	13.200	3.85	19.27	0.94
1.100	0.57	7.167	0.94	13.233	3.85	19.30	0.94
1.133	0.57	7.200	0.94	13.267	3.32	19.33	0.94
1.167	0.57	7.233	0.94	13.300	2.81	19.37	0.94
1.200	0.57	7.267	1.04	13.333	2.81	19.40	0.94
1.233	0.57	7.300	1.14	13.367	2.81	19.43	0.94
1.267	0.57	7.333	1.14	13.400	2.81	19.47	0.94
1.300	0.57	7.367	1.14	13.433	2.81	19.50	0.94
1.333	0.57	7.400	1.14	13.467	2.81	19.53	0.94

1.367	0.57	7.433	1.14	13.500	2.81	19.57	0.94
1.400	0.57	7.467	1.14	13.533	2.81	19.60	0.94
1.433	0.57	7.500	1.14	13.567	2.81	19.63	0.94
1.467	0.57	7.533	1.14	13.600	2.81	19.67	0.94
1.500	0.57	7.567	1.14	13.633	2.81	19.70	0.94
1.533	0.57	7.600	1.14	13.667	2.81	19.73	0.94
1.567	0.57	7.633	1.14	13.700	2.81	19.77	0.94
1.600	0.57	7.667	1.14	13.733	2.81	19.80	0.94
1.633	0.57	7.700	1.14	13.767	2.49	19.83	0.94
1.667	0.57	7.733	1.14	13.800	2.18	19.87	0.94
1.700	0.57	7.767	1.14	13.833	2.18	19.90	0.94
1.733	0.57	7.800	1.14	13.867	2.18	19.93	0.94
1.767	0.57	7.833	1.14	13.900	2.18	19.97	0.94
1.800	0.57	7.867	1.14	13.933	2.18	20.00	0.94
1.833	0.57	7.900	1.14	13.967	2.18	20.03	0.94
1.867	0.57	7.933	1.14	14.000	2.18	20.07	0.94
1.900	0.57	7.967	1.14	14.033	2.18	20.10	0.94
1.933	0.57	8.000	1.14	14.067	2.18	20.13	0.94
1.967	0.57	8.033	1.14	14.100	2.18	20.17	0.94
2.000	0.57	8.067	1.14	14.133	2.18	20.20	0.94
2.033	0.57	8.100	1.14	14.167	2.18	20.23	0.94
2.067	0.57	8.133	1.14	14.200	2.18	20.27	0.78
2.100	0.57	8.167	1.14	14.233	2.18	20.30	0.62
2.133	0.57	8.200	1.14	14.267	1.87	20.33	0.62
2.167	0.57	8.233	1.14	14.300	1.56	20.37	0.62
2.200	0.57	8.267	1.25	14.333	1.56	20.40	0.62
2.233	0.57	8.300	1.35	14.367	1.56	20.43	0.62
2.267	0.62	8.333	1.35	14.400	1.56	20.47	0.62
2.300	0.68	8.367	1.35	14.433	1.56	20.50	0.62
2.333	0.68	8.400	1.35	14.467	1.56	20.53	0.62
2.367	0.68	8.433	1.35	14.500	1.56	20.57	0.62
2.400	0.68	8.467	1.35	14.533	1.56	20.60	0.62
2.433	0.68	8.500	1.35	14.567	1.56	20.63	0.62
2.467	0.68	8.533	1.35	14.600	1.56	20.67	0.62
2.500	0.68	8.567	1.35	14.633	1.56	20.70	0.62
2.533	0.68	8.600	1.35	14.667	1.56	20.73	0.62
2.567	0.68	8.633	1.35	14.700	1.56	20.77	0.62
2.600	0.68	8.667	1.35	14.733	1.56	20.80	0.62
2.633	0.68	8.700	1.35	14.767	1.56	20.83	0.62
2.667	0.68	8.733	1.35	14.800	1.56	20.87	0.62
2.700	0.68	8.767	1.40	14.833	1.56	20.90	0.62
2.733	0.68	8.800	1.46	14.867	1.56	20.93	0.62
2.767	0.68	8.833	1.46	14.900	1.56	20.97	0.62
2.800	0.68	8.867	1.46	14.933	1.56	21.00	0.62
2.833	0.68	8.900	1.46	14.967	1.56	21.03	0.62
2.867	0.68	8.933	1.46	15.000	1.56	21.07	0.62
2.900	0.68	8.967	1.46	15.033	1.56	21.10	0.62
2.933	0.68	9.000	1.46	15.067	1.56	21.13	0.62
2.967	0.68	9.033	1.46	15.100	1.56	21.17	0.62

3.000	0.68	9.067	1.46	15.133	1.56	21.20	0.62
3.033	0.68	9.100	1.46	15.167	1.56	21.23	0.62
3.067	0.68	9.133	1.46	15.200	1.56	21.27	0.62
3.100	0.68	9.167	1.46	15.233	1.56	21.30	0.62
3.133	0.68	9.200	1.46	15.267	1.56	21.33	0.62
3.167	0.68	9.233	1.46	15.300	1.56	21.37	0.62
3.200	0.68	9.267	1.56	15.333	1.56	21.40	0.62
3.233	0.68	9.300	1.66	15.367	1.56	21.43	0.62
3.267	0.68	9.333	1.66	15.400	1.56	21.47	0.62
3.300	0.68	9.367	1.66	15.433	1.56	21.50	0.62
3.333	0.68	9.400	1.66	15.467	1.56	21.53	0.62
3.367	0.68	9.433	1.66	15.500	1.56	21.57	0.62
3.400	0.68	9.467	1.66	15.533	1.56	21.60	0.62
3.433	0.68	9.500	1.66	15.567	1.56	21.63	0.62
3.467	0.68	9.533	1.66	15.600	1.56	21.67	0.62
3.500	0.68	9.567	1.66	15.633	1.56	21.70	0.62
3.533	0.68	9.600	1.66	15.667	1.56	21.73	0.62
3.567	0.68	9.633	1.66	15.700	1.56	21.77	0.62
3.600	0.68	9.667	1.66	15.733	1.56	21.80	0.62
3.633	0.68	9.700	1.66	15.767	1.56	21.83	0.62
3.667	0.68	9.733	1.66	15.800	1.56	21.87	0.62
3.700	0.68	9.767	1.77	15.833	1.56	21.90	0.62
3.733	0.68	9.800	1.87	15.867	1.56	21.93	0.62
3.767	0.68	9.833	1.87	15.900	1.56	21.97	0.62
3.800	0.68	9.867	1.87	15.933	1.56	22.00	0.62
3.833	0.68	9.900	1.87	15.967	1.56	22.03	0.62
3.867	0.68	9.933	1.87	16.000	1.56	22.07	0.62
3.900	0.68	9.967	1.87	16.033	1.56	22.10	0.62
3.933	0.68	10.000	1.87	16.067	1.56	22.13	0.62
3.967	0.68	10.033	1.87	16.100	1.56	22.17	0.62
4.000	0.68	10.067	1.87	16.133	1.56	22.20	0.62
4.033	0.68	10.100	1.87	16.167	1.56	22.23	0.62
4.067	0.68	10.133	1.87	16.200	1.56	22.27	0.62
4.100	0.68	10.167	1.87	16.233	1.56	22.30	0.62
4.133	0.68	10.200	1.87	16.267	1.25	22.33	0.62
4.167	0.68	10.233	1.87	16.300	0.94	22.37	0.62
4.200	0.68	10.267	2.13	16.333	0.94	22.40	0.62
4.233	0.68	10.300	2.39	16.367	0.94	22.43	0.62
4.267	0.75	10.333	2.39	16.400	0.94	22.47	0.62
4.300	0.83	10.367	2.39	16.433	0.94	22.50	0.62
4.333	0.83	10.400	2.39	16.467	0.94	22.53	0.62
4.367	0.83	10.433	2.39	16.500	0.94	22.57	0.62
4.400	0.83	10.467	2.39	16.533	0.94	22.60	0.62
4.433	0.83	10.500	2.39	16.567	0.94	22.63	0.62
4.467	0.83	10.533	2.39	16.600	0.94	22.67	0.62
4.500	0.83	10.567	2.39	16.633	0.94	22.70	0.62
4.533	0.83	10.600	2.39	16.667	0.94	22.73	0.62
4.567	0.83	10.633	2.39	16.700	0.94	22.77	0.62
4.600	0.83	10.667	2.39	16.733	0.94	22.80	0.62

4.633	0.83	10.700	2.39	16.767	0.94	22.83	0.62
4.667	0.83	10.733	2.39	16.800	0.94	22.87	0.62
4.700	0.83	10.767	2.81	16.833	0.94	22.90	0.62
4.733	0.83	10.800	3.22	16.867	0.94	22.93	0.62
4.767	0.83	10.833	3.22	16.900	0.94	22.97	0.62
4.800	0.83	10.867	3.22	16.933	0.94	23.00	0.62
4.833	0.83	10.900	3.22	16.967	0.94	23.03	0.62
4.867	0.83	10.933	3.22	17.000	0.94	23.07	0.62
4.900	0.83	10.967	3.22	17.033	0.94	23.10	0.62
4.933	0.83	11.000	3.22	17.067	0.94	23.13	0.62
4.967	0.83	11.033	3.22	17.100	0.94	23.17	0.62
5.000	0.83	11.067	3.22	17.133	0.94	23.20	0.62
5.033	0.83	11.100	3.22	17.167	0.94	23.23	0.62
5.067	0.83	11.133	3.22	17.200	0.94	23.27	0.62
5.100	0.83	11.167	3.22	17.233	0.94	23.30	0.62
5.133	0.83	11.200	3.22	17.267	0.94	23.33	0.62
5.167	0.83	11.233	3.22	17.300	0.94	23.37	0.62
5.200	0.83	11.267	4.11	17.333	0.94	23.40	0.62
5.233	0.83	11.300	4.99	17.367	0.94	23.43	0.62
5.267	0.83	11.333	4.99	17.400	0.94	23.47	0.62
5.300	0.83	11.367	4.99	17.433	0.94	23.50	0.62
5.333	0.83	11.400	4.99	17.467	0.94	23.53	0.62
5.367	0.83	11.433	4.99	17.500	0.94	23.57	0.62
5.400	0.83	11.467	4.99	17.533	0.94	23.60	0.62
5.433	0.83	11.500	4.99	17.567	0.94	23.63	0.62
5.467	0.83	11.533	4.99	17.600	0.94	23.67	0.62
5.500	0.83	11.567	4.99	17.633	0.94	23.70	0.62
5.533	0.83	11.600	4.99	17.667	0.94	23.73	0.62
5.567	0.83	11.633	4.99	17.700	0.94	23.77	0.62
5.600	0.83	11.667	4.99	17.733	0.94	23.80	0.62
5.633	0.83	11.700	4.99	17.767	0.94	23.83	0.62
5.667	0.83	11.733	4.99	17.800	0.94	23.87	0.62
5.700	0.83	11.767	10.20	17.833	0.94	23.90	0.62
5.733	0.83	11.800	15.39	17.867	0.94	23.93	0.62
5.767	0.83	11.833	15.39	17.900	0.94	23.97	0.62
5.800	0.83	11.867	15.39	17.933	0.94	24.00	0.62
5.833	0.83	11.900	15.39	17.967	0.94	24.03	0.62
5.867	0.83	11.933	15.39	18.000	0.94	24.07	0.62
5.900	0.83	11.967	15.39	18.033	0.94	24.10	0.62
5.933	0.83	12.000	15.45	18.067	0.94	24.13	0.62
5.967	0.83	12.033	63.62	18.100	0.94	24.17	0.62
6.000	0.83	12.067	63.62	18.133	0.94	24.20	0.62
6.033	0.83	12.100	63.62	18.167	0.94	24.23	0.62
6.067	0.83	12.133	63.62	18.200	0.94	24.27	0.31

Max.Eff.Inten.(mm/hr)=	63.62	13.37
over (min)	5.00	8.00
Storage Coeff. (min)=	1.96 (ii)	7.76 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00

Unit Hyd. peak (cms)=	0.41	0.14	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.046 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	49.98	9.56	38.65
TOTAL RAINFALL (mm)=	51.98	51.98	51.98
RUNOFF COEFFICIENT =	0.96	0.18	0.74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.033	12.23	31.37
+ ID2= 2 (0160):	0.34	0.046	12.23	38.65
ID = 3 (0162):	0.65	0.078	12.23	35.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.069	12.23	29.29
+ ID2= 2 (0162):	0.65	0.078	12.23	35.18
ID = 3 (0167):	1.47	0.147	12.23	31.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		
STANDHYD (0140)	Area (ha)=	0.11
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00 Dir. Conn.(%)= 76.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.08	0.03
Dep. Storage (mm)=	2.00	5.00

SCS 24 hr_Exsting Conditions

Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.83	12.167	63.62	18.23	0.94
0.067	0.00	6.133	0.83	12.200	63.62	18.27	0.94
0.100	0.00	6.167	0.83	12.233	63.62	18.30	0.94
0.133	0.00	6.200	0.83	12.267	35.47	18.33	0.94
0.167	0.00	6.233	0.83	12.300	7.49	18.37	0.94
0.200	0.00	6.267	0.88	12.333	7.49	18.40	0.94
0.233	0.00	6.300	0.94	12.367	7.49	18.43	0.94
0.267	0.29	6.333	0.94	12.400	7.49	18.47	0.94
0.300	0.57	6.367	0.94	12.433	7.49	18.50	0.94
0.333	0.57	6.400	0.94	12.467	7.49	18.53	0.94
0.367	0.57	6.433	0.94	12.500	7.49	18.57	0.94
0.400	0.57	6.467	0.94	12.533	7.49	18.60	0.94
0.433	0.57	6.500	0.94	12.567	7.49	18.63	0.94
0.467	0.57	6.533	0.94	12.600	7.49	18.67	0.94
0.500	0.57	6.567	0.94	12.633	7.49	18.70	0.94
0.533	0.57	6.600	0.94	12.667	7.49	18.73	0.94
0.567	0.57	6.633	0.94	12.700	7.49	18.77	0.94
0.600	0.57	6.667	0.94	12.733	7.49	18.80	0.94
0.633	0.57	6.700	0.94	12.767	5.66	18.83	0.94
0.667	0.57	6.733	0.94	12.800	3.85	18.87	0.94
0.700	0.57	6.767	0.94	12.833	3.85	18.90	0.94
0.733	0.57	6.800	0.94	12.867	3.85	18.93	0.94
0.767	0.57	6.833	0.94	12.900	3.85	18.97	0.94
0.800	0.57	6.867	0.94	12.933	3.85	19.00	0.94
0.833	0.57	6.900	0.94	12.967	3.85	19.03	0.94
0.867	0.57	6.933	0.94	13.000	3.85	19.07	0.94
0.900	0.57	6.967	0.94	13.033	3.85	19.10	0.94
0.933	0.57	7.000	0.94	13.067	3.85	19.13	0.94
0.967	0.57	7.033	0.94	13.100	3.85	19.17	0.94
1.000	0.57	7.067	0.94	13.133	3.85	19.20	0.94
1.033	0.57	7.100	0.94	13.167	3.85	19.23	0.94
1.067	0.57	7.133	0.94	13.200	3.85	19.27	0.94
1.100	0.57	7.167	0.94	13.233	3.85	19.30	0.94
1.133	0.57	7.200	0.94	13.267	3.32	19.33	0.94
1.167	0.57	7.233	0.94	13.300	2.81	19.37	0.94
1.200	0.57	7.267	1.04	13.333	2.81	19.40	0.94
1.233	0.57	7.300	1.14	13.367	2.81	19.43	0.94
1.267	0.57	7.333	1.14	13.400	2.81	19.47	0.94
1.300	0.57	7.367	1.14	13.433	2.81	19.50	0.94

SCS 24 hr_Exsting Conditions

1.333	0.57	7.400	1.14	13.467	2.81	19.53	0.94
1.367	0.57	7.433	1.14	13.500	2.81	19.57	0.94
1.400	0.57	7.467	1.14	13.533	2.81	19.60	0.94
1.433	0.57	7.500	1.14	13.567	2.81	19.63	0.94
1.467	0.57	7.533	1.14	13.600	2.81	19.67	0.94
1.500	0.57	7.567	1.14	13.633	2.81	19.70	0.94
1.533	0.57	7.600	1.14	13.667	2.81	19.73	0.94
1.567	0.57	7.633	1.14	13.700	2.81	19.77	0.94
1.600	0.57	7.667	1.14	13.733	2.81	19.80	0.94
1.633	0.57	7.700	1.14	13.767	2.49	19.83	0.94
1.667	0.57	7.733	1.14	13.800	2.18	19.87	0.94
1.700	0.57	7.767	1.14	13.833	2.18	19.90	0.94
1.733	0.57	7.800	1.14	13.867	2.18	19.93	0.94
1.767	0.57	7.833	1.14	13.900	2.18	19.97	0.94
1.800	0.57	7.867	1.14	13.933	2.18	20.00	0.94
1.833	0.57	7.900	1.14	13.967	2.18	20.03	0.94
1.867	0.57	7.933	1.14	14.000	2.18	20.07	0.94
1.900	0.57	7.967	1.14	14.033	2.18	20.10	0.94
1.933	0.57	8.000	1.14	14.067	2.18	20.13	0.94
1.967	0.57	8.033	1.14	14.100	2.18	20.17	0.94
2.000	0.57	8.067	1.14	14.133	2.18	20.20	0.94
2.033	0.57	8.100	1.14	14.167	2.18	20.23	0.94
2.067	0.57	8.133	1.14	14.200	2.18	20.27	0.78
2.100	0.57	8.167	1.14	14.233	2.18	20.30	0.62
2.133	0.57	8.200	1.14	14.267	1.87	20.33	0.62
2.167	0.57	8.233	1.14	14.300	1.56	20.37	0.62
2.200	0.57	8.267	1.25	14.333	1.56	20.40	0.62
2.233	0.57	8.300	1.35	14.367	1.56	20.43	0.62
2.267	0.62	8.333	1.35	14.400	1.56	20.47	0.62
2.300	0.68	8.367	1.35	14.433	1.56	20.50	0.62
2.333	0.68	8.400	1.35	14.467	1.56	20.53	0.62
2.367	0.68	8.433	1.35	14.500	1.56	20.57	0.62
2.400	0.68	8.467	1.35	14.533	1.56	20.60	0.62
2.433	0.68	8.500	1.35	14.567	1.56	20.63	0.62
2.467	0.68	8.533	1.35	14.600	1.56	20.67	0.62
2.500	0.68	8.567	1.35	14.633	1.56	20.70	0.62
2.533	0.68	8.600	1.35	14.667	1.56	20.73	0.62
2.567	0.68	8.633	1.35	14.700	1.56	20.77	0.62
2.600	0.68	8.667	1.35	14.733	1.56	20.80	0.62
2.633	0.68	8.700	1.35	14.767	1.56	20.83	0.62
2.667	0.68	8.733	1.35	14.800	1.56	20.87	0.62
2.700	0.68	8.767	1.40	14.833	1.56	20.90	0.62
2.733	0.68	8.800	1.46	14.867	1.56	20.93	0.62
2.767	0.68	8.833	1.46	14.900	1.56	20.97	0.62
2.800	0.68	8.867	1.46	14.933	1.56	21.00	0.62
2.833	0.68	8.900	1.46	14.967	1.56	21.03	0.62
2.867	0.68	8.933	1.46	15.000	1.56	21.07	0.62
2.900	0.68	8.967	1.46	15.033	1.56	21.10	0.62
2.933	0.68	9.000	1.46	15.067	1.56	21.13	0.62

SCS 24 hr_Exsting Conditions

2.967	0.68	9.033	1.46	15.100	1.56	21.17	0.62
3.000	0.68	9.067	1.46	15.133	1.56	21.20	0.62
3.033	0.68	9.100	1.46	15.167	1.56	21.23	0.62
3.067	0.68	9.133	1.46	15.200	1.56	21.27	0.62
3.100	0.68	9.167	1.46	15.233	1.56	21.30	0.62
3.133	0.68	9.200	1.46	15.267	1.56	21.33	0.62
3.167	0.68	9.233	1.46	15.300	1.56	21.37	0.62
3.200	0.68	9.267	1.56	15.333	1.56	21.40	0.62
3.233	0.68	9.300	1.66	15.367	1.56	21.43	0.62
3.267	0.68	9.333	1.66	15.400	1.56	21.47	0.62
3.300	0.68	9.367	1.66	15.433	1.56	21.50	0.62
3.333	0.68	9.400	1.66	15.467	1.56	21.53	0.62
3.367	0.68	9.433	1.66	15.500	1.56	21.57	0.62
3.400	0.68	9.467	1.66	15.533	1.56	21.60	0.62
3.433	0.68	9.500	1.66	15.567	1.56	21.63	0.62
3.467	0.68	9.533	1.66	15.600	1.56	21.67	0.62
3.500	0.68	9.567	1.66	15.633	1.56	21.70	0.62
3.533	0.68	9.600	1.66	15.667	1.56	21.73	0.62
3.567	0.68	9.633	1.66	15.700	1.56	21.77	0.62
3.600	0.68	9.667	1.66	15.733	1.56	21.80	0.62
3.633	0.68	9.700	1.66	15.767	1.56	21.83	0.62
3.667	0.68	9.733	1.66	15.800	1.56	21.87	0.62
3.700	0.68	9.767	1.77	15.833	1.56	21.90	0.62
3.733	0.68	9.800	1.87	15.867	1.56	21.93	0.62
3.767	0.68	9.833	1.87	15.900	1.56	21.97	0.62
3.800	0.68	9.867	1.87	15.933	1.56	22.00	0.62
3.833	0.68	9.900	1.87	15.967	1.56	22.03	0.62
3.867	0.68	9.933	1.87	16.000	1.56	22.07	0.62
3.900	0.68	9.967	1.87	16.033	1.56	22.10	0.62
3.933	0.68	10.000	1.87	16.067	1.56	22.13	0.62
3.967	0.68	10.033	1.87	16.100	1.56	22.17	0.62
4.000	0.68	10.067	1.87	16.133	1.56	22.20	0.62
4.033	0.68	10.100	1.87	16.167	1.56	22.23	0.62
4.067	0.68	10.133	1.87	16.200	1.56	22.27	0.62
4.100	0.68	10.167	1.87	16.233	1.56	22.30	0.62
4.133	0.68	10.200	1.87	16.267	1.25	22.33	0.62
4.167	0.68	10.233	1.87	16.300	0.94	22.37	0.62
4.200	0.68	10.267	2.13	16.333	0.94	22.40	0.62
4.233	0.68	10.300	2.39	16.367	0.94	22.43	0.62
4.267	0.75	10.333	2.39	16.400	0.94	22.47	0.62
4.300	0.83	10.367	2.39	16.433	0.94	22.50	0.62
4.333	0.83	10.400	2.39	16.467	0.94	22.53	0.62
4.367	0.83	10.433	2.39	16.500	0.94	22.57	0.62
4.400	0.83	10.467	2.39	16.533	0.94	22.60	0.62
4.433	0.83	10.500	2.39	16.567	0.94	22.63	0.62
4.467	0.83	10.533	2.39	16.600	0.94	22.67	0.62
4.500	0.83	10.567	2.39	16.633	0.94	22.70	0.62
4.533	0.83	10.600	2.39	16.667	0.94	22.73	0.62
4.567	0.83	10.633	2.39	16.700	0.94	22.77	0.62

SCS 24 hr_Exsting Conditions

4.600	0.83	10.667	2.39	16.733	0.94	22.80	0.62
4.633	0.83	10.700	2.39	16.767	0.94	22.83	0.62
4.667	0.83	10.733	2.39	16.800	0.94	22.87	0.62
4.700	0.83	10.767	2.81	16.833	0.94	22.90	0.62
4.733	0.83	10.800	3.22	16.867	0.94	22.93	0.62
4.767	0.83	10.833	3.22	16.900	0.94	22.97	0.62
4.800	0.83	10.867	3.22	16.933	0.94	23.00	0.62
4.833	0.83	10.900	3.22	16.967	0.94	23.03	0.62
4.867	0.83	10.933	3.22	17.000	0.94	23.07	0.62
4.900	0.83	10.967	3.22	17.033	0.94	23.10	0.62
4.933	0.83	11.000	3.22	17.067	0.94	23.13	0.62
4.967	0.83	11.033	3.22	17.100	0.94	23.17	0.62
5.000	0.83	11.067	3.22	17.133	0.94	23.20	0.62
5.033	0.83	11.100	3.22	17.167	0.94	23.23	0.62
5.067	0.83	11.133	3.22	17.200	0.94	23.27	0.62
5.100	0.83	11.167	3.22	17.233	0.94	23.30	0.62
5.133	0.83	11.200	3.22	17.267	0.94	23.33	0.62
5.167	0.83	11.233	3.22	17.300	0.94	23.37	0.62
5.200	0.83	11.267	4.11	17.333	0.94	23.40	0.62
5.233	0.83	11.300	4.99	17.367	0.94	23.43	0.62
5.267	0.83	11.333	4.99	17.400	0.94	23.47	0.62
5.300	0.83	11.367	4.99	17.433	0.94	23.50	0.62
5.333	0.83	11.400	4.99	17.467	0.94	23.53	0.62
5.367	0.83	11.433	4.99	17.500	0.94	23.57	0.62
5.400	0.83	11.467	4.99	17.533	0.94	23.60	0.62
5.433	0.83	11.500	4.99	17.567	0.94	23.63	0.62
5.467	0.83	11.533	4.99	17.600	0.94	23.67	0.62
5.500	0.83	11.567	4.99	17.633	0.94	23.70	0.62
5.533	0.83	11.600	4.99	17.667	0.94	23.73	0.62
5.567	0.83	11.633	4.99	17.700	0.94	23.77	0.62
5.600	0.83	11.667	4.99	17.733	0.94	23.80	0.62
5.633	0.83	11.700	4.99	17.767	0.94	23.83	0.62
5.667	0.83	11.733	4.99	17.800	0.94	23.87	0.62
5.700	0.83	11.767	10.20	17.833	0.94	23.90	0.62
5.733	0.83	11.800	15.39	17.867	0.94	23.93	0.62
5.767	0.83	11.833	15.39	17.900	0.94	23.97	0.62
5.800	0.83	11.867	15.39	17.933	0.94	24.00	0.62
5.833	0.83	11.900	15.39	17.967	0.94	24.03	0.62
5.867	0.83	11.933	15.39	18.000	0.94	24.07	0.62
5.900	0.83	11.967	15.39	18.033	0.94	24.10	0.62
5.933	0.83	12.000	15.45	18.067	0.94	24.13	0.62
5.967	0.83	12.033	63.62	18.100	0.94	24.17	0.62
6.000	0.83	12.067	63.62	18.133	0.94	24.20	0.62
6.033	0.83	12.100	63.62	18.167	0.94	24.23	0.62
6.067	0.83	12.133	63.62	18.200	0.94	24.27	0.31

Max.Eff.Inten.(mm/hr)=		63.62	13.37
	over (min)	5.00	8.00
Storage Coeff. (min)=		1.40 (ii)	6.73 (ii)

Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.16	
			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.015 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	49.98	9.56	40.26
TOTAL RAINFALL (mm)=	51.98	51.98	51.98
RUNOFF COEFFICIENT =	0.96	0.18	0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
  V V    I      SS   U   U  A   A  L
   VV    I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
```

Developed and Distributed by Smart City Water Inc

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0a39e51c-fe2e-45cc-a540-4c8fddd1aba8\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0a39e51c-fe2e-45cc-a540-4c8fddd1aba8\sc

DATE: 01-16-2026 TIME: 04:30:13

USER:

COMMENTS: _____

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**********************************************
** SIMULATION : 24hr SCS 50yr                **
**********************************************
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READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\56b3036e-ed23-4339-a443-7ff2161d9767\495c385b
Ptotal= 89.86 mm	Comments: 24hr SCS 50yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.62	12.50	12.94	18.75	1.62
0.25	0.99	6.50	1.62	12.75	6.65	19.00	1.62
0.50	0.99	6.75	1.62	13.00	6.65	19.25	1.62
0.75	0.99	7.00	1.62	13.25	4.85	19.50	1.62
1.00	0.99	7.25	1.98	13.50	4.85	19.75	1.62
1.25	0.99	7.50	1.98	13.75	3.77	20.00	1.62
1.50	0.99	7.75	1.98	14.00	3.77	20.25	1.08
1.75	0.99	8.00	1.98	14.25	2.70	20.50	1.08
2.00	0.99	8.25	2.34	14.50	2.70	20.75	1.08
2.25	1.17	8.50	2.34	14.75	2.70	21.00	1.08
2.50	1.17	8.75	2.52	15.00	2.70	21.25	1.08
2.75	1.17	9.00	2.52	15.25	2.70	21.50	1.08
3.00	1.17	9.25	2.88	15.50	2.70	21.75	1.08
3.25	1.17	9.50	2.88	15.75	2.70	22.00	1.08
3.50	1.17	9.75	3.23	16.00	2.70	22.25	1.08
3.75	1.17	10.00	3.23	16.25	1.62	22.50	1.08
4.00	1.17	10.25	4.13	16.50	1.62	22.75	1.08
4.25	1.44	10.50	4.13	16.75	1.62	23.00	1.08
4.50	1.44	10.75	5.57	17.00	1.62	23.25	1.08
4.75	1.44	11.00	5.57	17.25	1.62	23.50	1.08
5.00	1.44	11.25	8.63	17.50	1.62	23.75	1.08
5.25	1.44	11.50	8.63	17.75	1.62	24.00	1.08
5.50	1.44	11.75	26.60	18.00	1.62		
5.75	1.44	12.00	109.99	18.25	1.62		
6.00	1.44	12.25	12.94	18.50	1.62		

CALIB	
STANDHYD (0120)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 77.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.08	0.03
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	27.08	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.44	12.167	109.99	18.23	1.62
0.067	0.00	6.133	1.44	12.200	109.99	18.27	1.62
0.100	0.00	6.167	1.44	12.233	109.99	18.30	1.62
0.133	0.00	6.200	1.44	12.267	61.32	18.33	1.62
0.167	0.00	6.233	1.44	12.300	12.94	18.37	1.62
0.200	0.00	6.267	1.53	12.333	12.94	18.40	1.62
0.233	0.00	6.300	1.62	12.367	12.94	18.43	1.62
0.267	0.49	6.333	1.62	12.400	12.94	18.47	1.62
0.300	0.99	6.367	1.62	12.433	12.94	18.50	1.62
0.333	0.99	6.400	1.62	12.467	12.94	18.53	1.62
0.367	0.99	6.433	1.62	12.500	12.94	18.57	1.62
0.400	0.99	6.467	1.62	12.533	12.94	18.60	1.62
0.433	0.99	6.500	1.62	12.567	12.94	18.63	1.62
0.467	0.99	6.533	1.62	12.600	12.94	18.67	1.62
0.500	0.99	6.567	1.62	12.633	12.94	18.70	1.62
0.533	0.99	6.600	1.62	12.667	12.94	18.73	1.62
0.567	0.99	6.633	1.62	12.700	12.94	18.77	1.62
0.600	0.99	6.667	1.62	12.733	12.94	18.80	1.62
0.633	0.99	6.700	1.62	12.767	9.78	18.83	1.62
0.667	0.99	6.733	1.62	12.800	6.65	18.87	1.62
0.700	0.99	6.767	1.62	12.833	6.65	18.90	1.62
0.733	0.99	6.800	1.62	12.867	6.65	18.93	1.62
0.767	0.99	6.833	1.62	12.900	6.65	18.97	1.62
0.800	0.99	6.867	1.62	12.933	6.65	19.00	1.62
0.833	0.99	6.900	1.62	12.967	6.65	19.03	1.62
0.867	0.99	6.933	1.62	13.000	6.65	19.07	1.62
0.900	0.99	6.967	1.62	13.033	6.65	19.10	1.62
0.933	0.99	7.000	1.62	13.067	6.65	19.13	1.62

0.967	0.99	7.033	1.62	13.100	6.65	19.17	1.62
1.000	0.99	7.067	1.62	13.133	6.65	19.20	1.62
1.033	0.99	7.100	1.62	13.167	6.65	19.23	1.62
1.067	0.99	7.133	1.62	13.200	6.65	19.27	1.62
1.100	0.99	7.167	1.62	13.233	6.65	19.30	1.62
1.133	0.99	7.200	1.62	13.267	5.75	19.33	1.62
1.167	0.99	7.233	1.62	13.300	4.85	19.37	1.62
1.200	0.99	7.267	1.80	13.333	4.85	19.40	1.62
1.233	0.99	7.300	1.98	13.367	4.85	19.43	1.62
1.267	0.99	7.333	1.98	13.400	4.85	19.47	1.62
1.300	0.99	7.367	1.98	13.433	4.85	19.50	1.62
1.333	0.99	7.400	1.98	13.467	4.85	19.53	1.62
1.367	0.99	7.433	1.98	13.500	4.85	19.57	1.62
1.400	0.99	7.467	1.98	13.533	4.85	19.60	1.62
1.433	0.99	7.500	1.98	13.567	4.85	19.63	1.62
1.467	0.99	7.533	1.98	13.600	4.85	19.67	1.62
1.500	0.99	7.567	1.98	13.633	4.85	19.70	1.62
1.533	0.99	7.600	1.98	13.667	4.85	19.73	1.62
1.567	0.99	7.633	1.98	13.700	4.85	19.77	1.62
1.600	0.99	7.667	1.98	13.733	4.85	19.80	1.62
1.633	0.99	7.700	1.98	13.767	4.31	19.83	1.62
1.667	0.99	7.733	1.98	13.800	3.77	19.87	1.62
1.700	0.99	7.767	1.98	13.833	3.77	19.90	1.62
1.733	0.99	7.800	1.98	13.867	3.77	19.93	1.62
1.767	0.99	7.833	1.98	13.900	3.77	19.97	1.62
1.800	0.99	7.867	1.98	13.933	3.77	20.00	1.62
1.833	0.99	7.900	1.98	13.967	3.77	20.03	1.62
1.867	0.99	7.933	1.98	14.000	3.77	20.07	1.62
1.900	0.99	7.967	1.98	14.033	3.77	20.10	1.62
1.933	0.99	8.000	1.98	14.067	3.77	20.13	1.62
1.967	0.99	8.033	1.98	14.100	3.77	20.17	1.62
2.000	0.99	8.067	1.98	14.133	3.77	20.20	1.62
2.033	0.99	8.100	1.98	14.167	3.77	20.23	1.62
2.067	0.99	8.133	1.98	14.200	3.77	20.27	1.35
2.100	0.99	8.167	1.98	14.233	3.77	20.30	1.08
2.133	0.99	8.200	1.98	14.267	3.23	20.33	1.08
2.167	0.99	8.233	1.98	14.300	2.70	20.37	1.08
2.200	0.99	8.267	2.16	14.333	2.70	20.40	1.08
2.233	0.99	8.300	2.34	14.367	2.70	20.43	1.08
2.267	1.08	8.333	2.34	14.400	2.70	20.47	1.08
2.300	1.17	8.367	2.34	14.433	2.70	20.50	1.08
2.333	1.17	8.400	2.34	14.467	2.70	20.53	1.08
2.367	1.17	8.433	2.34	14.500	2.70	20.57	1.08
2.400	1.17	8.467	2.34	14.533	2.70	20.60	1.08
2.433	1.17	8.500	2.34	14.567	2.70	20.63	1.08
2.467	1.17	8.533	2.34	14.600	2.70	20.67	1.08
2.500	1.17	8.567	2.34	14.633	2.70	20.70	1.08
2.533	1.17	8.600	2.34	14.667	2.70	20.73	1.08
2.567	1.17	8.633	2.34	14.700	2.70	20.77	1.08

2.600	1.17	8.667	2.34	14.733	2.70	20.80	1.08
2.633	1.17	8.700	2.34	14.767	2.70	20.83	1.08
2.667	1.17	8.733	2.34	14.800	2.70	20.87	1.08
2.700	1.17	8.767	2.43	14.833	2.70	20.90	1.08
2.733	1.17	8.800	2.52	14.867	2.70	20.93	1.08
2.767	1.17	8.833	2.52	14.900	2.70	20.97	1.08
2.800	1.17	8.867	2.52	14.933	2.70	21.00	1.08
2.833	1.17	8.900	2.52	14.967	2.70	21.03	1.08
2.867	1.17	8.933	2.52	15.000	2.70	21.07	1.08
2.900	1.17	8.967	2.52	15.033	2.70	21.10	1.08
2.933	1.17	9.000	2.52	15.067	2.70	21.13	1.08
2.967	1.17	9.033	2.52	15.100	2.70	21.17	1.08
3.000	1.17	9.067	2.52	15.133	2.70	21.20	1.08
3.033	1.17	9.100	2.52	15.167	2.70	21.23	1.08
3.067	1.17	9.133	2.52	15.200	2.70	21.27	1.08
3.100	1.17	9.167	2.52	15.233	2.70	21.30	1.08
3.133	1.17	9.200	2.52	15.267	2.70	21.33	1.08
3.167	1.17	9.233	2.52	15.300	2.70	21.37	1.08
3.200	1.17	9.267	2.70	15.333	2.70	21.40	1.08
3.233	1.17	9.300	2.88	15.367	2.70	21.43	1.08
3.267	1.17	9.333	2.88	15.400	2.70	21.47	1.08
3.300	1.17	9.367	2.88	15.433	2.70	21.50	1.08
3.333	1.17	9.400	2.88	15.467	2.70	21.53	1.08
3.367	1.17	9.433	2.88	15.500	2.70	21.57	1.08
3.400	1.17	9.467	2.88	15.533	2.70	21.60	1.08
3.433	1.17	9.500	2.88	15.567	2.70	21.63	1.08
3.467	1.17	9.533	2.88	15.600	2.70	21.67	1.08
3.500	1.17	9.567	2.88	15.633	2.70	21.70	1.08
3.533	1.17	9.600	2.88	15.667	2.70	21.73	1.08
3.567	1.17	9.633	2.88	15.700	2.70	21.77	1.08
3.600	1.17	9.667	2.88	15.733	2.70	21.80	1.08
3.633	1.17	9.700	2.88	15.767	2.70	21.83	1.08
3.667	1.17	9.733	2.88	15.800	2.70	21.87	1.08
3.700	1.17	9.767	3.06	15.833	2.70	21.90	1.08
3.733	1.17	9.800	3.23	15.867	2.70	21.93	1.08
3.767	1.17	9.833	3.23	15.900	2.70	21.97	1.08
3.800	1.17	9.867	3.23	15.933	2.70	22.00	1.08
3.833	1.17	9.900	3.23	15.967	2.70	22.03	1.08
3.867	1.17	9.933	3.23	16.000	2.70	22.07	1.08
3.900	1.17	9.967	3.23	16.033	2.70	22.10	1.08
3.933	1.17	10.000	3.24	16.067	2.70	22.13	1.08
3.967	1.17	10.033	3.23	16.100	2.70	22.17	1.08
4.000	1.17	10.067	3.23	16.133	2.70	22.20	1.08
4.033	1.17	10.100	3.23	16.167	2.70	22.23	1.08
4.067	1.17	10.133	3.23	16.200	2.70	22.27	1.08
4.100	1.17	10.167	3.23	16.233	2.70	22.30	1.08
4.133	1.17	10.200	3.23	16.267	2.15	22.33	1.08
4.167	1.17	10.233	3.23	16.300	1.62	22.37	1.08
4.200	1.17	10.267	3.68	16.333	1.62	22.40	1.08

4.233	1.17	10.300	4.13	16.367	1.62	22.43	1.08
4.267	1.30	10.333	4.13	16.400	1.62	22.47	1.08
4.300	1.44	10.367	4.13	16.433	1.62	22.50	1.08
4.333	1.44	10.400	4.13	16.467	1.62	22.53	1.08
4.367	1.44	10.433	4.13	16.500	1.62	22.57	1.08
4.400	1.44	10.467	4.13	16.533	1.62	22.60	1.08
4.433	1.44	10.500	4.13	16.567	1.62	22.63	1.08
4.467	1.44	10.533	4.13	16.600	1.62	22.67	1.08
4.500	1.44	10.567	4.13	16.633	1.62	22.70	1.08
4.533	1.44	10.600	4.13	16.667	1.62	22.73	1.08
4.567	1.44	10.633	4.13	16.700	1.62	22.77	1.08
4.600	1.44	10.667	4.13	16.733	1.62	22.80	1.08
4.633	1.44	10.700	4.13	16.767	1.62	22.83	1.08
4.667	1.44	10.733	4.13	16.800	1.62	22.87	1.08
4.700	1.44	10.767	4.85	16.833	1.62	22.90	1.08
4.733	1.44	10.800	5.57	16.867	1.62	22.93	1.08
4.767	1.44	10.833	5.57	16.900	1.62	22.97	1.08
4.800	1.44	10.867	5.57	16.933	1.62	23.00	1.08
4.833	1.44	10.900	5.57	16.967	1.62	23.03	1.08
4.867	1.44	10.933	5.57	17.000	1.62	23.07	1.08
4.900	1.44	10.967	5.57	17.033	1.62	23.10	1.08
4.933	1.44	11.000	5.57	17.067	1.62	23.13	1.08
4.967	1.44	11.033	5.57	17.100	1.62	23.17	1.08
5.000	1.44	11.067	5.57	17.133	1.62	23.20	1.08
5.033	1.44	11.100	5.57	17.167	1.62	23.23	1.08
5.067	1.44	11.133	5.57	17.200	1.62	23.27	1.08
5.100	1.44	11.167	5.57	17.233	1.62	23.30	1.08
5.133	1.44	11.200	5.57	17.267	1.62	23.33	1.08
5.167	1.44	11.233	5.57	17.300	1.62	23.37	1.08
5.200	1.44	11.267	7.10	17.333	1.62	23.40	1.08
5.233	1.44	11.300	8.63	17.367	1.62	23.43	1.08
5.267	1.44	11.333	8.63	17.400	1.62	23.47	1.08
5.300	1.44	11.367	8.63	17.433	1.62	23.50	1.08
5.333	1.44	11.400	8.63	17.467	1.62	23.53	1.08
5.367	1.44	11.433	8.63	17.500	1.62	23.57	1.08
5.400	1.44	11.467	8.63	17.533	1.62	23.60	1.08
5.433	1.44	11.500	8.63	17.567	1.62	23.63	1.08
5.467	1.44	11.533	8.63	17.600	1.62	23.67	1.08
5.500	1.44	11.567	8.63	17.633	1.62	23.70	1.08
5.533	1.44	11.600	8.63	17.667	1.62	23.73	1.08
5.567	1.44	11.633	8.63	17.700	1.62	23.77	1.08
5.600	1.44	11.667	8.63	17.733	1.62	23.80	1.08
5.633	1.44	11.700	8.63	17.767	1.62	23.83	1.08
5.667	1.44	11.733	8.63	17.800	1.62	23.87	1.08
5.700	1.44	11.767	17.64	17.833	1.62	23.90	1.08
5.733	1.44	11.800	26.60	17.867	1.62	23.93	1.08
5.767	1.44	11.833	26.60	17.900	1.62	23.97	1.08
5.800	1.44	11.867	26.60	17.933	1.62	24.00	1.08
5.833	1.44	11.900	26.60	17.967	1.62	24.03	1.08

5.867	1.44	11.933	26.60	18.000	1.62	24.07	1.08
5.900	1.44	11.967	26.60	18.033	1.62	24.10	1.08
5.933	1.44	12.000	26.72	18.067	1.62	24.13	1.08
5.967	1.44	12.033	109.99	18.100	1.62	24.17	1.08
6.000	1.44	12.067	109.99	18.133	1.62	24.20	1.08
6.033	1.44	12.100	109.99	18.167	1.62	24.23	1.08
6.067	1.44	12.133	109.99	18.200	1.62	24.27	0.54

Max.Eff.Inten.(mm/hr)=		109.99	55.24
over (min)		5.00	6.00
Storage Coeff. (min)=		1.12 (ii)	5.31 (ii)
Unit Hyd. Tpeak (min)=		4.00	6.00
Unit Hyd. peak (cms)=		0.50	0.20
			TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK	(hrs)=	12.23	12.27	12.23
RUNOFF VOLUME	(mm)=	87.86	38.18	76.42
TOTAL RAINFALL	(mm)=	89.86	89.86	89.86
RUNOFF COEFFICIENT	=	0.98	0.42	0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0110)	Area (ha)=	0.71	
ID= 1 DT= 2.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	0.00	6.100	1.44	12.167	109.99	18.23	1.62
0.067	0.00	6.133	1.44	12.200	109.99	18.27	1.62

0.100	0.00	6.167	1.44	12.233	109.99	18.30	1.62
0.133	0.00	6.200	1.44	12.267	61.32	18.33	1.62
0.167	0.00	6.233	1.44	12.300	12.94	18.37	1.62
0.200	0.00	6.267	1.53	12.333	12.94	18.40	1.62
0.233	0.00	6.300	1.62	12.367	12.94	18.43	1.62
0.267	0.49	6.333	1.62	12.400	12.94	18.47	1.62
0.300	0.99	6.367	1.62	12.433	12.94	18.50	1.62
0.333	0.99	6.400	1.62	12.467	12.94	18.53	1.62
0.367	0.99	6.433	1.62	12.500	12.94	18.57	1.62
0.400	0.99	6.467	1.62	12.533	12.94	18.60	1.62
0.433	0.99	6.500	1.62	12.567	12.94	18.63	1.62
0.467	0.99	6.533	1.62	12.600	12.94	18.67	1.62
0.500	0.99	6.567	1.62	12.633	12.94	18.70	1.62
0.533	0.99	6.600	1.62	12.667	12.94	18.73	1.62
0.567	0.99	6.633	1.62	12.700	12.94	18.77	1.62
0.600	0.99	6.667	1.62	12.733	12.94	18.80	1.62
0.633	0.99	6.700	1.62	12.767	9.78	18.83	1.62
0.667	0.99	6.733	1.62	12.800	6.65	18.87	1.62
0.700	0.99	6.767	1.62	12.833	6.65	18.90	1.62
0.733	0.99	6.800	1.62	12.867	6.65	18.93	1.62
0.767	0.99	6.833	1.62	12.900	6.65	18.97	1.62
0.800	0.99	6.867	1.62	12.933	6.65	19.00	1.62
0.833	0.99	6.900	1.62	12.967	6.65	19.03	1.62
0.867	0.99	6.933	1.62	13.000	6.65	19.07	1.62
0.900	0.99	6.967	1.62	13.033	6.65	19.10	1.62
0.933	0.99	7.000	1.62	13.067	6.65	19.13	1.62
0.967	0.99	7.033	1.62	13.100	6.65	19.17	1.62
1.000	0.99	7.067	1.62	13.133	6.65	19.20	1.62
1.033	0.99	7.100	1.62	13.167	6.65	19.23	1.62
1.067	0.99	7.133	1.62	13.200	6.65	19.27	1.62
1.100	0.99	7.167	1.62	13.233	6.65	19.30	1.62
1.133	0.99	7.200	1.62	13.267	5.75	19.33	1.62
1.167	0.99	7.233	1.62	13.300	4.85	19.37	1.62
1.200	0.99	7.267	1.80	13.333	4.85	19.40	1.62
1.233	0.99	7.300	1.98	13.367	4.85	19.43	1.62
1.267	0.99	7.333	1.98	13.400	4.85	19.47	1.62
1.300	0.99	7.367	1.98	13.433	4.85	19.50	1.62
1.333	0.99	7.400	1.98	13.467	4.85	19.53	1.62
1.367	0.99	7.433	1.98	13.500	4.85	19.57	1.62
1.400	0.99	7.467	1.98	13.533	4.85	19.60	1.62
1.433	0.99	7.500	1.98	13.567	4.85	19.63	1.62
1.467	0.99	7.533	1.98	13.600	4.85	19.67	1.62
1.500	0.99	7.567	1.98	13.633	4.85	19.70	1.62
1.533	0.99	7.600	1.98	13.667	4.85	19.73	1.62
1.567	0.99	7.633	1.98	13.700	4.85	19.77	1.62
1.600	0.99	7.667	1.98	13.733	4.85	19.80	1.62
1.633	0.99	7.700	1.98	13.767	4.31	19.83	1.62
1.667	0.99	7.733	1.98	13.800	3.77	19.87	1.62
1.700	0.99	7.767	1.98	13.833	3.77	19.90	1.62

1.733	0.99	7.800	1.98	13.867	3.77	19.93	1.62
1.767	0.99	7.833	1.98	13.900	3.77	19.97	1.62
1.800	0.99	7.867	1.98	13.933	3.77	20.00	1.62
1.833	0.99	7.900	1.98	13.967	3.77	20.03	1.62
1.867	0.99	7.933	1.98	14.000	3.77	20.07	1.62
1.900	0.99	7.967	1.98	14.033	3.77	20.10	1.62
1.933	0.99	8.000	1.98	14.067	3.77	20.13	1.62
1.967	0.99	8.033	1.98	14.100	3.77	20.17	1.62
2.000	0.99	8.067	1.98	14.133	3.77	20.20	1.62
2.033	0.99	8.100	1.98	14.167	3.77	20.23	1.62
2.067	0.99	8.133	1.98	14.200	3.77	20.27	1.35
2.100	0.99	8.167	1.98	14.233	3.77	20.30	1.08
2.133	0.99	8.200	1.98	14.267	3.23	20.33	1.08
2.167	0.99	8.233	1.98	14.300	2.70	20.37	1.08
2.200	0.99	8.267	2.16	14.333	2.70	20.40	1.08
2.233	0.99	8.300	2.34	14.367	2.70	20.43	1.08
2.267	1.08	8.333	2.34	14.400	2.70	20.47	1.08
2.300	1.17	8.367	2.34	14.433	2.70	20.50	1.08
2.333	1.17	8.400	2.34	14.467	2.70	20.53	1.08
2.367	1.17	8.433	2.34	14.500	2.70	20.57	1.08
2.400	1.17	8.467	2.34	14.533	2.70	20.60	1.08
2.433	1.17	8.500	2.34	14.567	2.70	20.63	1.08
2.467	1.17	8.533	2.34	14.600	2.70	20.67	1.08
2.500	1.17	8.567	2.34	14.633	2.70	20.70	1.08
2.533	1.17	8.600	2.34	14.667	2.70	20.73	1.08
2.567	1.17	8.633	2.34	14.700	2.70	20.77	1.08
2.600	1.17	8.667	2.34	14.733	2.70	20.80	1.08
2.633	1.17	8.700	2.34	14.767	2.70	20.83	1.08
2.667	1.17	8.733	2.34	14.800	2.70	20.87	1.08
2.700	1.17	8.767	2.43	14.833	2.70	20.90	1.08
2.733	1.17	8.800	2.52	14.867	2.70	20.93	1.08
2.767	1.17	8.833	2.52	14.900	2.70	20.97	1.08
2.800	1.17	8.867	2.52	14.933	2.70	21.00	1.08
2.833	1.17	8.900	2.52	14.967	2.70	21.03	1.08
2.867	1.17	8.933	2.52	15.000	2.70	21.07	1.08
2.900	1.17	8.967	2.52	15.033	2.70	21.10	1.08
2.933	1.17	9.000	2.52	15.067	2.70	21.13	1.08
2.967	1.17	9.033	2.52	15.100	2.70	21.17	1.08
3.000	1.17	9.067	2.52	15.133	2.70	21.20	1.08
3.033	1.17	9.100	2.52	15.167	2.70	21.23	1.08
3.067	1.17	9.133	2.52	15.200	2.70	21.27	1.08
3.100	1.17	9.167	2.52	15.233	2.70	21.30	1.08
3.133	1.17	9.200	2.52	15.267	2.70	21.33	1.08
3.167	1.17	9.233	2.52	15.300	2.70	21.37	1.08
3.200	1.17	9.267	2.70	15.333	2.70	21.40	1.08
3.233	1.17	9.300	2.88	15.367	2.70	21.43	1.08
3.267	1.17	9.333	2.88	15.400	2.70	21.47	1.08
3.300	1.17	9.367	2.88	15.433	2.70	21.50	1.08
3.333	1.17	9.400	2.88	15.467	2.70	21.53	1.08

SCS 24 hr_Exsting Conditions

3.367	1.17	9.433	2.88	15.500	2.70	21.57	1.08
3.400	1.17	9.467	2.88	15.533	2.70	21.60	1.08
3.433	1.17	9.500	2.88	15.567	2.70	21.63	1.08
3.467	1.17	9.533	2.88	15.600	2.70	21.67	1.08
3.500	1.17	9.567	2.88	15.633	2.70	21.70	1.08
3.533	1.17	9.600	2.88	15.667	2.70	21.73	1.08
3.567	1.17	9.633	2.88	15.700	2.70	21.77	1.08
3.600	1.17	9.667	2.88	15.733	2.70	21.80	1.08
3.633	1.17	9.700	2.88	15.767	2.70	21.83	1.08
3.667	1.17	9.733	2.88	15.800	2.70	21.87	1.08
3.700	1.17	9.767	3.06	15.833	2.70	21.90	1.08
3.733	1.17	9.800	3.23	15.867	2.70	21.93	1.08
3.767	1.17	9.833	3.23	15.900	2.70	21.97	1.08
3.800	1.17	9.867	3.23	15.933	2.70	22.00	1.08
3.833	1.17	9.900	3.23	15.967	2.70	22.03	1.08
3.867	1.17	9.933	3.23	16.000	2.70	22.07	1.08
3.900	1.17	9.967	3.23	16.033	2.70	22.10	1.08
3.933	1.17	10.000	3.24	16.067	2.70	22.13	1.08
3.967	1.17	10.033	3.23	16.100	2.70	22.17	1.08
4.000	1.17	10.067	3.23	16.133	2.70	22.20	1.08
4.033	1.17	10.100	3.23	16.167	2.70	22.23	1.08
4.067	1.17	10.133	3.23	16.200	2.70	22.27	1.08
4.100	1.17	10.167	3.23	16.233	2.70	22.30	1.08
4.133	1.17	10.200	3.23	16.267	2.15	22.33	1.08
4.167	1.17	10.233	3.23	16.300	1.62	22.37	1.08
4.200	1.17	10.267	3.68	16.333	1.62	22.40	1.08
4.233	1.17	10.300	4.13	16.367	1.62	22.43	1.08
4.267	1.30	10.333	4.13	16.400	1.62	22.47	1.08
4.300	1.44	10.367	4.13	16.433	1.62	22.50	1.08
4.333	1.44	10.400	4.13	16.467	1.62	22.53	1.08
4.367	1.44	10.433	4.13	16.500	1.62	22.57	1.08
4.400	1.44	10.467	4.13	16.533	1.62	22.60	1.08
4.433	1.44	10.500	4.13	16.567	1.62	22.63	1.08
4.467	1.44	10.533	4.13	16.600	1.62	22.67	1.08
4.500	1.44	10.567	4.13	16.633	1.62	22.70	1.08
4.533	1.44	10.600	4.13	16.667	1.62	22.73	1.08
4.567	1.44	10.633	4.13	16.700	1.62	22.77	1.08
4.600	1.44	10.667	4.13	16.733	1.62	22.80	1.08
4.633	1.44	10.700	4.13	16.767	1.62	22.83	1.08
4.667	1.44	10.733	4.13	16.800	1.62	22.87	1.08
4.700	1.44	10.767	4.85	16.833	1.62	22.90	1.08
4.733	1.44	10.800	5.57	16.867	1.62	22.93	1.08
4.767	1.44	10.833	5.57	16.900	1.62	22.97	1.08
4.800	1.44	10.867	5.57	16.933	1.62	23.00	1.08
4.833	1.44	10.900	5.57	16.967	1.62	23.03	1.08
4.867	1.44	10.933	5.57	17.000	1.62	23.07	1.08
4.900	1.44	10.967	5.57	17.033	1.62	23.10	1.08
4.933	1.44	11.000	5.57	17.067	1.62	23.13	1.08
4.967	1.44	11.033	5.57	17.100	1.62	23.17	1.08

SCS 24 hr_Exsting Conditions

5.000	1.44	11.067	5.57	17.133	1.62	23.20	1.08
5.033	1.44	11.100	5.57	17.167	1.62	23.23	1.08
5.067	1.44	11.133	5.57	17.200	1.62	23.27	1.08
5.100	1.44	11.167	5.57	17.233	1.62	23.30	1.08
5.133	1.44	11.200	5.57	17.267	1.62	23.33	1.08
5.167	1.44	11.233	5.57	17.300	1.62	23.37	1.08
5.200	1.44	11.267	7.10	17.333	1.62	23.40	1.08
5.233	1.44	11.300	8.63	17.367	1.62	23.43	1.08
5.267	1.44	11.333	8.63	17.400	1.62	23.47	1.08
5.300	1.44	11.367	8.63	17.433	1.62	23.50	1.08
5.333	1.44	11.400	8.63	17.467	1.62	23.53	1.08
5.367	1.44	11.433	8.63	17.500	1.62	23.57	1.08
5.400	1.44	11.467	8.63	17.533	1.62	23.60	1.08
5.433	1.44	11.500	8.63	17.567	1.62	23.63	1.08
5.467	1.44	11.533	8.63	17.600	1.62	23.67	1.08
5.500	1.44	11.567	8.63	17.633	1.62	23.70	1.08
5.533	1.44	11.600	8.63	17.667	1.62	23.73	1.08
5.567	1.44	11.633	8.63	17.700	1.62	23.77	1.08
5.600	1.44	11.667	8.63	17.733	1.62	23.80	1.08
5.633	1.44	11.700	8.63	17.767	1.62	23.83	1.08
5.667	1.44	11.733	8.63	17.800	1.62	23.87	1.08
5.700	1.44	11.767	17.64	17.833	1.62	23.90	1.08
5.733	1.44	11.800	26.60	17.867	1.62	23.93	1.08
5.767	1.44	11.833	26.60	17.900	1.62	23.97	1.08
5.800	1.44	11.867	26.60	17.933	1.62	24.00	1.08
5.833	1.44	11.900	26.60	17.967	1.62	24.03	1.08
5.867	1.44	11.933	26.60	18.000	1.62	24.07	1.08
5.900	1.44	11.967	26.60	18.033	1.62	24.10	1.08
5.933	1.44	12.000	26.72	18.067	1.62	24.13	1.08
5.967	1.44	12.033	109.99	18.100	1.62	24.17	1.08
6.000	1.44	12.067	109.99	18.133	1.62	24.20	1.08
6.033	1.44	12.100	109.99	18.167	1.62	24.23	1.08
6.067	1.44	12.133	109.99	18.200	1.62	24.27	0.54

Max.Eff.Inten.(mm/hr)=	109.99	55.24	
over (min)	5.00	12.00	
Storage Coeff. (min)=	1.96 (ii)	10.91 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.41	0.10	
			TOTALS
PEAK FLOW (cms)=	0.08	0.05	0.115 (iii)
TIME TO PEAK (hrs)=	12.23	12.33	12.23
RUNOFF VOLUME (mm)=	87.86	38.18	56.06
TOTAL RAINFALL (mm)=	89.86	89.86	89.86
RUNOFF COEFFICIENT =	0.98	0.42	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

SCS 24 hr_Exsting Conditions

CN* = 71.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0110):	0.71	0.115	12.23	56.06
+ ID2= 2 (0120):	0.11	0.029	12.23	76.42
ID = 3 (0122):	0.82	0.144	12.23	58.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB | STANDHYD (0150) | ID= 1 DT= 2.0 min	Area (ha)= 0.31 Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.44	12.167	109.99	18.23	1.62
0.067	0.00	6.133	1.44	12.200	109.99	18.27	1.62
0.100	0.00	6.167	1.44	12.233	109.99	18.30	1.62
0.133	0.00	6.200	1.44	12.267	61.32	18.33	1.62
0.167	0.00	6.233	1.44	12.300	12.94	18.37	1.62
0.200	0.00	6.267	1.53	12.333	12.94	18.40	1.62
0.233	0.00	6.300	1.62	12.367	12.94	18.43	1.62
0.267	0.49	6.333	1.62	12.400	12.94	18.47	1.62
0.300	0.99	6.367	1.62	12.433	12.94	18.50	1.62
0.333	0.99	6.400	1.62	12.467	12.94	18.53	1.62
0.367	0.99	6.433	1.62	12.500	12.94	18.57	1.62
0.400	0.99	6.467	1.62	12.533	12.94	18.60	1.62
0.433	0.99	6.500	1.62	12.567	12.94	18.63	1.62

0.467	0.99	6.533	1.62	12.600	12.94	18.67	1.62
0.500	0.99	6.567	1.62	12.633	12.94	18.70	1.62
0.533	0.99	6.600	1.62	12.667	12.94	18.73	1.62
0.567	0.99	6.633	1.62	12.700	12.94	18.77	1.62
0.600	0.99	6.667	1.62	12.733	12.94	18.80	1.62
0.633	0.99	6.700	1.62	12.767	9.78	18.83	1.62
0.667	0.99	6.733	1.62	12.800	6.65	18.87	1.62
0.700	0.99	6.767	1.62	12.833	6.65	18.90	1.62
0.733	0.99	6.800	1.62	12.867	6.65	18.93	1.62
0.767	0.99	6.833	1.62	12.900	6.65	18.97	1.62
0.800	0.99	6.867	1.62	12.933	6.65	19.00	1.62
0.833	0.99	6.900	1.62	12.967	6.65	19.03	1.62
0.867	0.99	6.933	1.62	13.000	6.65	19.07	1.62
0.900	0.99	6.967	1.62	13.033	6.65	19.10	1.62
0.933	0.99	7.000	1.62	13.067	6.65	19.13	1.62
0.967	0.99	7.033	1.62	13.100	6.65	19.17	1.62
1.000	0.99	7.067	1.62	13.133	6.65	19.20	1.62
1.033	0.99	7.100	1.62	13.167	6.65	19.23	1.62
1.067	0.99	7.133	1.62	13.200	6.65	19.27	1.62
1.100	0.99	7.167	1.62	13.233	6.65	19.30	1.62
1.133	0.99	7.200	1.62	13.267	5.75	19.33	1.62
1.167	0.99	7.233	1.62	13.300	4.85	19.37	1.62
1.200	0.99	7.267	1.80	13.333	4.85	19.40	1.62
1.233	0.99	7.300	1.98	13.367	4.85	19.43	1.62
1.267	0.99	7.333	1.98	13.400	4.85	19.47	1.62
1.300	0.99	7.367	1.98	13.433	4.85	19.50	1.62
1.333	0.99	7.400	1.98	13.467	4.85	19.53	1.62
1.367	0.99	7.433	1.98	13.500	4.85	19.57	1.62
1.400	0.99	7.467	1.98	13.533	4.85	19.60	1.62
1.433	0.99	7.500	1.98	13.567	4.85	19.63	1.62
1.467	0.99	7.533	1.98	13.600	4.85	19.67	1.62
1.500	0.99	7.567	1.98	13.633	4.85	19.70	1.62
1.533	0.99	7.600	1.98	13.667	4.85	19.73	1.62
1.567	0.99	7.633	1.98	13.700	4.85	19.77	1.62
1.600	0.99	7.667	1.98	13.733	4.85	19.80	1.62
1.633	0.99	7.700	1.98	13.767	4.31	19.83	1.62
1.667	0.99	7.733	1.98	13.800	3.77	19.87	1.62
1.700	0.99	7.767	1.98	13.833	3.77	19.90	1.62
1.733	0.99	7.800	1.98	13.867	3.77	19.93	1.62
1.767	0.99	7.833	1.98	13.900	3.77	19.97	1.62
1.800	0.99	7.867	1.98	13.933	3.77	20.00	1.62
1.833	0.99	7.900	1.98	13.967	3.77	20.03	1.62
1.867	0.99	7.933	1.98	14.000	3.77	20.07	1.62
1.900	0.99	7.967	1.98	14.033	3.77	20.10	1.62
1.933	0.99	8.000	1.98	14.067	3.77	20.13	1.62
1.967	0.99	8.033	1.98	14.100	3.77	20.17	1.62
2.000	0.99	8.067	1.98	14.133	3.77	20.20	1.62
2.033	0.99	8.100	1.98	14.167	3.77	20.23	1.62
2.067	0.99	8.133	1.98	14.200	3.77	20.27	1.35

2.100	0.99	8.167	1.98	14.233	3.77	20.30	1.08
2.133	0.99	8.200	1.98	14.267	3.23	20.33	1.08
2.167	0.99	8.233	1.98	14.300	2.70	20.37	1.08
2.200	0.99	8.267	2.16	14.333	2.70	20.40	1.08
2.233	0.99	8.300	2.34	14.367	2.70	20.43	1.08
2.267	1.08	8.333	2.34	14.400	2.70	20.47	1.08
2.300	1.17	8.367	2.34	14.433	2.70	20.50	1.08
2.333	1.17	8.400	2.34	14.467	2.70	20.53	1.08
2.367	1.17	8.433	2.34	14.500	2.70	20.57	1.08
2.400	1.17	8.467	2.34	14.533	2.70	20.60	1.08
2.433	1.17	8.500	2.34	14.567	2.70	20.63	1.08
2.467	1.17	8.533	2.34	14.600	2.70	20.67	1.08
2.500	1.17	8.567	2.34	14.633	2.70	20.70	1.08
2.533	1.17	8.600	2.34	14.667	2.70	20.73	1.08
2.567	1.17	8.633	2.34	14.700	2.70	20.77	1.08
2.600	1.17	8.667	2.34	14.733	2.70	20.80	1.08
2.633	1.17	8.700	2.34	14.767	2.70	20.83	1.08
2.667	1.17	8.733	2.34	14.800	2.70	20.87	1.08
2.700	1.17	8.767	2.43	14.833	2.70	20.90	1.08
2.733	1.17	8.800	2.52	14.867	2.70	20.93	1.08
2.767	1.17	8.833	2.52	14.900	2.70	20.97	1.08
2.800	1.17	8.867	2.52	14.933	2.70	21.00	1.08
2.833	1.17	8.900	2.52	14.967	2.70	21.03	1.08
2.867	1.17	8.933	2.52	15.000	2.70	21.07	1.08
2.900	1.17	8.967	2.52	15.033	2.70	21.10	1.08
2.933	1.17	9.000	2.52	15.067	2.70	21.13	1.08
2.967	1.17	9.033	2.52	15.100	2.70	21.17	1.08
3.000	1.17	9.067	2.52	15.133	2.70	21.20	1.08
3.033	1.17	9.100	2.52	15.167	2.70	21.23	1.08
3.067	1.17	9.133	2.52	15.200	2.70	21.27	1.08
3.100	1.17	9.167	2.52	15.233	2.70	21.30	1.08
3.133	1.17	9.200	2.52	15.267	2.70	21.33	1.08
3.167	1.17	9.233	2.52	15.300	2.70	21.37	1.08
3.200	1.17	9.267	2.70	15.333	2.70	21.40	1.08
3.233	1.17	9.300	2.88	15.367	2.70	21.43	1.08
3.267	1.17	9.333	2.88	15.400	2.70	21.47	1.08
3.300	1.17	9.367	2.88	15.433	2.70	21.50	1.08
3.333	1.17	9.400	2.88	15.467	2.70	21.53	1.08
3.367	1.17	9.433	2.88	15.500	2.70	21.57	1.08
3.400	1.17	9.467	2.88	15.533	2.70	21.60	1.08
3.433	1.17	9.500	2.88	15.567	2.70	21.63	1.08
3.467	1.17	9.533	2.88	15.600	2.70	21.67	1.08
3.500	1.17	9.567	2.88	15.633	2.70	21.70	1.08
3.533	1.17	9.600	2.88	15.667	2.70	21.73	1.08
3.567	1.17	9.633	2.88	15.700	2.70	21.77	1.08
3.600	1.17	9.667	2.88	15.733	2.70	21.80	1.08
3.633	1.17	9.700	2.88	15.767	2.70	21.83	1.08
3.667	1.17	9.733	2.88	15.800	2.70	21.87	1.08
3.700	1.17	9.767	3.06	15.833	2.70	21.90	1.08

3.733	1.17	9.800	3.23	15.867	2.70	21.93	1.08
3.767	1.17	9.833	3.23	15.900	2.70	21.97	1.08
3.800	1.17	9.867	3.23	15.933	2.70	22.00	1.08
3.833	1.17	9.900	3.23	15.967	2.70	22.03	1.08
3.867	1.17	9.933	3.23	16.000	2.70	22.07	1.08
3.900	1.17	9.967	3.23	16.033	2.70	22.10	1.08
3.933	1.17	10.000	3.24	16.067	2.70	22.13	1.08
3.967	1.17	10.033	3.23	16.100	2.70	22.17	1.08
4.000	1.17	10.067	3.23	16.133	2.70	22.20	1.08
4.033	1.17	10.100	3.23	16.167	2.70	22.23	1.08
4.067	1.17	10.133	3.23	16.200	2.70	22.27	1.08
4.100	1.17	10.167	3.23	16.233	2.70	22.30	1.08
4.133	1.17	10.200	3.23	16.267	2.15	22.33	1.08
4.167	1.17	10.233	3.23	16.300	1.62	22.37	1.08
4.200	1.17	10.267	3.68	16.333	1.62	22.40	1.08
4.233	1.17	10.300	4.13	16.367	1.62	22.43	1.08
4.267	1.30	10.333	4.13	16.400	1.62	22.47	1.08
4.300	1.44	10.367	4.13	16.433	1.62	22.50	1.08
4.333	1.44	10.400	4.13	16.467	1.62	22.53	1.08
4.367	1.44	10.433	4.13	16.500	1.62	22.57	1.08
4.400	1.44	10.467	4.13	16.533	1.62	22.60	1.08
4.433	1.44	10.500	4.13	16.567	1.62	22.63	1.08
4.467	1.44	10.533	4.13	16.600	1.62	22.67	1.08
4.500	1.44	10.567	4.13	16.633	1.62	22.70	1.08
4.533	1.44	10.600	4.13	16.667	1.62	22.73	1.08
4.567	1.44	10.633	4.13	16.700	1.62	22.77	1.08
4.600	1.44	10.667	4.13	16.733	1.62	22.80	1.08
4.633	1.44	10.700	4.13	16.767	1.62	22.83	1.08
4.667	1.44	10.733	4.13	16.800	1.62	22.87	1.08
4.700	1.44	10.767	4.85	16.833	1.62	22.90	1.08
4.733	1.44	10.800	5.57	16.867	1.62	22.93	1.08
4.767	1.44	10.833	5.57	16.900	1.62	22.97	1.08
4.800	1.44	10.867	5.57	16.933	1.62	23.00	1.08
4.833	1.44	10.900	5.57	16.967	1.62	23.03	1.08
4.867	1.44	10.933	5.57	17.000	1.62	23.07	1.08
4.900	1.44	10.967	5.57	17.033	1.62	23.10	1.08
4.933	1.44	11.000	5.57	17.067	1.62	23.13	1.08
4.967	1.44	11.033	5.57	17.100	1.62	23.17	1.08
5.000	1.44	11.067	5.57	17.133	1.62	23.20	1.08
5.033	1.44	11.100	5.57	17.167	1.62	23.23	1.08
5.067	1.44	11.133	5.57	17.200	1.62	23.27	1.08
5.100	1.44	11.167	5.57	17.233	1.62	23.30	1.08
5.133	1.44	11.200	5.57	17.267	1.62	23.33	1.08
5.167	1.44	11.233	5.57	17.300	1.62	23.37	1.08
5.200	1.44	11.267	7.10	17.333	1.62	23.40	1.08
5.233	1.44	11.300	8.63	17.367	1.62	23.43	1.08
5.267	1.44	11.333	8.63	17.400	1.62	23.47	1.08
5.300	1.44	11.367	8.63	17.433	1.62	23.50	1.08
5.333	1.44	11.400	8.63	17.467	1.62	23.53	1.08

5.367	1.44	11.433	8.63	17.500	1.62	23.57	1.08
5.400	1.44	11.467	8.63	17.533	1.62	23.60	1.08
5.433	1.44	11.500	8.63	17.567	1.62	23.63	1.08
5.467	1.44	11.533	8.63	17.600	1.62	23.67	1.08
5.500	1.44	11.567	8.63	17.633	1.62	23.70	1.08
5.533	1.44	11.600	8.63	17.667	1.62	23.73	1.08
5.567	1.44	11.633	8.63	17.700	1.62	23.77	1.08
5.600	1.44	11.667	8.63	17.733	1.62	23.80	1.08
5.633	1.44	11.700	8.63	17.767	1.62	23.83	1.08
5.667	1.44	11.733	8.63	17.800	1.62	23.87	1.08
5.700	1.44	11.767	17.64	17.833	1.62	23.90	1.08
5.733	1.44	11.800	26.60	17.867	1.62	23.93	1.08
5.767	1.44	11.833	26.60	17.900	1.62	23.97	1.08
5.800	1.44	11.867	26.60	17.933	1.62	24.00	1.08
5.833	1.44	11.900	26.60	17.967	1.62	24.03	1.08
5.867	1.44	11.933	26.60	18.000	1.62	24.07	1.08
5.900	1.44	11.967	26.60	18.033	1.62	24.10	1.08
5.933	1.44	12.000	26.72	18.067	1.62	24.13	1.08
5.967	1.44	12.033	109.99	18.100	1.62	24.17	1.08
6.000	1.44	12.067	109.99	18.133	1.62	24.20	1.08
6.033	1.44	12.100	109.99	18.167	1.62	24.23	1.08
6.067	1.44	12.133	109.99	18.200	1.62	24.27	0.54

Max.Eff.Inten.(mm/hr)=	109.99	37.99	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.53 (ii)	7.90 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.45	0.14	
			TOTALS
PEAK FLOW (cms)=	0.05	0.01	0.062 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	87.86	26.79	59.75
TOTAL RAINFALL (mm)=	89.86	89.86	89.86
RUNOFF COEFFICIENT =	0.98	0.30	0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

SCS 24 hr_Exsting Conditions

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.44	12.167	109.99	18.23	1.62
0.067	0.00	6.133	1.44	12.200	109.99	18.27	1.62
0.100	0.00	6.167	1.44	12.233	109.99	18.30	1.62
0.133	0.00	6.200	1.44	12.267	61.32	18.33	1.62
0.167	0.00	6.233	1.44	12.300	12.94	18.37	1.62
0.200	0.00	6.267	1.53	12.333	12.94	18.40	1.62
0.233	0.00	6.300	1.62	12.367	12.94	18.43	1.62
0.267	0.49	6.333	1.62	12.400	12.94	18.47	1.62
0.300	0.99	6.367	1.62	12.433	12.94	18.50	1.62
0.333	0.99	6.400	1.62	12.467	12.94	18.53	1.62
0.367	0.99	6.433	1.62	12.500	12.94	18.57	1.62
0.400	0.99	6.467	1.62	12.533	12.94	18.60	1.62
0.433	0.99	6.500	1.62	12.567	12.94	18.63	1.62
0.467	0.99	6.533	1.62	12.600	12.94	18.67	1.62
0.500	0.99	6.567	1.62	12.633	12.94	18.70	1.62
0.533	0.99	6.600	1.62	12.667	12.94	18.73	1.62
0.567	0.99	6.633	1.62	12.700	12.94	18.77	1.62
0.600	0.99	6.667	1.62	12.733	12.94	18.80	1.62
0.633	0.99	6.700	1.62	12.767	9.78	18.83	1.62
0.667	0.99	6.733	1.62	12.800	6.65	18.87	1.62
0.700	0.99	6.767	1.62	12.833	6.65	18.90	1.62
0.733	0.99	6.800	1.62	12.867	6.65	18.93	1.62
0.767	0.99	6.833	1.62	12.900	6.65	18.97	1.62
0.800	0.99	6.867	1.62	12.933	6.65	19.00	1.62
0.833	0.99	6.900	1.62	12.967	6.65	19.03	1.62
0.867	0.99	6.933	1.62	13.000	6.65	19.07	1.62
0.900	0.99	6.967	1.62	13.033	6.65	19.10	1.62
0.933	0.99	7.000	1.62	13.067	6.65	19.13	1.62
0.967	0.99	7.033	1.62	13.100	6.65	19.17	1.62
1.000	0.99	7.067	1.62	13.133	6.65	19.20	1.62
1.033	0.99	7.100	1.62	13.167	6.65	19.23	1.62
1.067	0.99	7.133	1.62	13.200	6.65	19.27	1.62
1.100	0.99	7.167	1.62	13.233	6.65	19.30	1.62
1.133	0.99	7.200	1.62	13.267	5.75	19.33	1.62
1.167	0.99	7.233	1.62	13.300	4.85	19.37	1.62
1.200	0.99	7.267	1.80	13.333	4.85	19.40	1.62

1.233	0.99	7.300	1.98	13.367	4.85	19.43	1.62
1.267	0.99	7.333	1.98	13.400	4.85	19.47	1.62
1.300	0.99	7.367	1.98	13.433	4.85	19.50	1.62
1.333	0.99	7.400	1.98	13.467	4.85	19.53	1.62
1.367	0.99	7.433	1.98	13.500	4.85	19.57	1.62
1.400	0.99	7.467	1.98	13.533	4.85	19.60	1.62
1.433	0.99	7.500	1.98	13.567	4.85	19.63	1.62
1.467	0.99	7.533	1.98	13.600	4.85	19.67	1.62
1.500	0.99	7.567	1.98	13.633	4.85	19.70	1.62
1.533	0.99	7.600	1.98	13.667	4.85	19.73	1.62
1.567	0.99	7.633	1.98	13.700	4.85	19.77	1.62
1.600	0.99	7.667	1.98	13.733	4.85	19.80	1.62
1.633	0.99	7.700	1.98	13.767	4.31	19.83	1.62
1.667	0.99	7.733	1.98	13.800	3.77	19.87	1.62
1.700	0.99	7.767	1.98	13.833	3.77	19.90	1.62
1.733	0.99	7.800	1.98	13.867	3.77	19.93	1.62
1.767	0.99	7.833	1.98	13.900	3.77	19.97	1.62
1.800	0.99	7.867	1.98	13.933	3.77	20.00	1.62
1.833	0.99	7.900	1.98	13.967	3.77	20.03	1.62
1.867	0.99	7.933	1.98	14.000	3.77	20.07	1.62
1.900	0.99	7.967	1.98	14.033	3.77	20.10	1.62
1.933	0.99	8.000	1.98	14.067	3.77	20.13	1.62
1.967	0.99	8.033	1.98	14.100	3.77	20.17	1.62
2.000	0.99	8.067	1.98	14.133	3.77	20.20	1.62
2.033	0.99	8.100	1.98	14.167	3.77	20.23	1.62
2.067	0.99	8.133	1.98	14.200	3.77	20.27	1.35
2.100	0.99	8.167	1.98	14.233	3.77	20.30	1.08
2.133	0.99	8.200	1.98	14.267	3.23	20.33	1.08
2.167	0.99	8.233	1.98	14.300	2.70	20.37	1.08
2.200	0.99	8.267	2.16	14.333	2.70	20.40	1.08
2.233	0.99	8.300	2.34	14.367	2.70	20.43	1.08
2.267	1.08	8.333	2.34	14.400	2.70	20.47	1.08
2.300	1.17	8.367	2.34	14.433	2.70	20.50	1.08
2.333	1.17	8.400	2.34	14.467	2.70	20.53	1.08
2.367	1.17	8.433	2.34	14.500	2.70	20.57	1.08
2.400	1.17	8.467	2.34	14.533	2.70	20.60	1.08
2.433	1.17	8.500	2.34	14.567	2.70	20.63	1.08
2.467	1.17	8.533	2.34	14.600	2.70	20.67	1.08
2.500	1.17	8.567	2.34	14.633	2.70	20.70	1.08
2.533	1.17	8.600	2.34	14.667	2.70	20.73	1.08
2.567	1.17	8.633	2.34	14.700	2.70	20.77	1.08
2.600	1.17	8.667	2.34	14.733	2.70	20.80	1.08
2.633	1.17	8.700	2.34	14.767	2.70	20.83	1.08
2.667	1.17	8.733	2.34	14.800	2.70	20.87	1.08
2.700	1.17	8.767	2.43	14.833	2.70	20.90	1.08
2.733	1.17	8.800	2.52	14.867	2.70	20.93	1.08
2.767	1.17	8.833	2.52	14.900	2.70	20.97	1.08
2.800	1.17	8.867	2.52	14.933	2.70	21.00	1.08
2.833	1.17	8.900	2.52	14.967	2.70	21.03	1.08

2.867	1.17	8.933	2.52	15.000	2.70	21.07	1.08
2.900	1.17	8.967	2.52	15.033	2.70	21.10	1.08
2.933	1.17	9.000	2.52	15.067	2.70	21.13	1.08
2.967	1.17	9.033	2.52	15.100	2.70	21.17	1.08
3.000	1.17	9.067	2.52	15.133	2.70	21.20	1.08
3.033	1.17	9.100	2.52	15.167	2.70	21.23	1.08
3.067	1.17	9.133	2.52	15.200	2.70	21.27	1.08
3.100	1.17	9.167	2.52	15.233	2.70	21.30	1.08
3.133	1.17	9.200	2.52	15.267	2.70	21.33	1.08
3.167	1.17	9.233	2.52	15.300	2.70	21.37	1.08
3.200	1.17	9.267	2.70	15.333	2.70	21.40	1.08
3.233	1.17	9.300	2.88	15.367	2.70	21.43	1.08
3.267	1.17	9.333	2.88	15.400	2.70	21.47	1.08
3.300	1.17	9.367	2.88	15.433	2.70	21.50	1.08
3.333	1.17	9.400	2.88	15.467	2.70	21.53	1.08
3.367	1.17	9.433	2.88	15.500	2.70	21.57	1.08
3.400	1.17	9.467	2.88	15.533	2.70	21.60	1.08
3.433	1.17	9.500	2.88	15.567	2.70	21.63	1.08
3.467	1.17	9.533	2.88	15.600	2.70	21.67	1.08
3.500	1.17	9.567	2.88	15.633	2.70	21.70	1.08
3.533	1.17	9.600	2.88	15.667	2.70	21.73	1.08
3.567	1.17	9.633	2.88	15.700	2.70	21.77	1.08
3.600	1.17	9.667	2.88	15.733	2.70	21.80	1.08
3.633	1.17	9.700	2.88	15.767	2.70	21.83	1.08
3.667	1.17	9.733	2.88	15.800	2.70	21.87	1.08
3.700	1.17	9.767	3.06	15.833	2.70	21.90	1.08
3.733	1.17	9.800	3.23	15.867	2.70	21.93	1.08
3.767	1.17	9.833	3.23	15.900	2.70	21.97	1.08
3.800	1.17	9.867	3.23	15.933	2.70	22.00	1.08
3.833	1.17	9.900	3.23	15.967	2.70	22.03	1.08
3.867	1.17	9.933	3.23	16.000	2.70	22.07	1.08
3.900	1.17	9.967	3.23	16.033	2.70	22.10	1.08
3.933	1.17	10.000	3.24	16.067	2.70	22.13	1.08
3.967	1.17	10.033	3.23	16.100	2.70	22.17	1.08
4.000	1.17	10.067	3.23	16.133	2.70	22.20	1.08
4.033	1.17	10.100	3.23	16.167	2.70	22.23	1.08
4.067	1.17	10.133	3.23	16.200	2.70	22.27	1.08
4.100	1.17	10.167	3.23	16.233	2.70	22.30	1.08
4.133	1.17	10.200	3.23	16.267	2.15	22.33	1.08
4.167	1.17	10.233	3.23	16.300	1.62	22.37	1.08
4.200	1.17	10.267	3.68	16.333	1.62	22.40	1.08
4.233	1.17	10.300	4.13	16.367	1.62	22.43	1.08
4.267	1.30	10.333	4.13	16.400	1.62	22.47	1.08
4.300	1.44	10.367	4.13	16.433	1.62	22.50	1.08
4.333	1.44	10.400	4.13	16.467	1.62	22.53	1.08
4.367	1.44	10.433	4.13	16.500	1.62	22.57	1.08
4.400	1.44	10.467	4.13	16.533	1.62	22.60	1.08
4.433	1.44	10.500	4.13	16.567	1.62	22.63	1.08
4.467	1.44	10.533	4.13	16.600	1.62	22.67	1.08

4.500	1.44	10.567	4.13	16.633	1.62	22.70	1.08
4.533	1.44	10.600	4.13	16.667	1.62	22.73	1.08
4.567	1.44	10.633	4.13	16.700	1.62	22.77	1.08
4.600	1.44	10.667	4.13	16.733	1.62	22.80	1.08
4.633	1.44	10.700	4.13	16.767	1.62	22.83	1.08
4.667	1.44	10.733	4.13	16.800	1.62	22.87	1.08
4.700	1.44	10.767	4.85	16.833	1.62	22.90	1.08
4.733	1.44	10.800	5.57	16.867	1.62	22.93	1.08
4.767	1.44	10.833	5.57	16.900	1.62	22.97	1.08
4.800	1.44	10.867	5.57	16.933	1.62	23.00	1.08
4.833	1.44	10.900	5.57	16.967	1.62	23.03	1.08
4.867	1.44	10.933	5.57	17.000	1.62	23.07	1.08
4.900	1.44	10.967	5.57	17.033	1.62	23.10	1.08
4.933	1.44	11.000	5.57	17.067	1.62	23.13	1.08
4.967	1.44	11.033	5.57	17.100	1.62	23.17	1.08
5.000	1.44	11.067	5.57	17.133	1.62	23.20	1.08
5.033	1.44	11.100	5.57	17.167	1.62	23.23	1.08
5.067	1.44	11.133	5.57	17.200	1.62	23.27	1.08
5.100	1.44	11.167	5.57	17.233	1.62	23.30	1.08
5.133	1.44	11.200	5.57	17.267	1.62	23.33	1.08
5.167	1.44	11.233	5.57	17.300	1.62	23.37	1.08
5.200	1.44	11.267	7.10	17.333	1.62	23.40	1.08
5.233	1.44	11.300	8.63	17.367	1.62	23.43	1.08
5.267	1.44	11.333	8.63	17.400	1.62	23.47	1.08
5.300	1.44	11.367	8.63	17.433	1.62	23.50	1.08
5.333	1.44	11.400	8.63	17.467	1.62	23.53	1.08
5.367	1.44	11.433	8.63	17.500	1.62	23.57	1.08
5.400	1.44	11.467	8.63	17.533	1.62	23.60	1.08
5.433	1.44	11.500	8.63	17.567	1.62	23.63	1.08
5.467	1.44	11.533	8.63	17.600	1.62	23.67	1.08
5.500	1.44	11.567	8.63	17.633	1.62	23.70	1.08
5.533	1.44	11.600	8.63	17.667	1.62	23.73	1.08
5.567	1.44	11.633	8.63	17.700	1.62	23.77	1.08
5.600	1.44	11.667	8.63	17.733	1.62	23.80	1.08
5.633	1.44	11.700	8.63	17.767	1.62	23.83	1.08
5.667	1.44	11.733	8.63	17.800	1.62	23.87	1.08
5.700	1.44	11.767	17.64	17.833	1.62	23.90	1.08
5.733	1.44	11.800	26.60	17.867	1.62	23.93	1.08
5.767	1.44	11.833	26.60	17.900	1.62	23.97	1.08
5.800	1.44	11.867	26.60	17.933	1.62	24.00	1.08
5.833	1.44	11.900	26.60	17.967	1.62	24.03	1.08
5.867	1.44	11.933	26.60	18.000	1.62	24.07	1.08
5.900	1.44	11.967	26.60	18.033	1.62	24.10	1.08
5.933	1.44	12.000	26.72	18.067	1.62	24.13	1.08
5.967	1.44	12.033	109.99	18.100	1.62	24.17	1.08
6.000	1.44	12.067	109.99	18.133	1.62	24.20	1.08
6.033	1.44	12.100	109.99	18.167	1.62	24.23	1.08
6.067	1.44	12.133	109.99	18.200	1.62	24.27	0.54

Max.Eff.Inten.(mm/hr)=	109.99	37.99	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.58 (ii)	6.23 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.45	0.17	
			TOTALS
PEAK FLOW (cms)=	0.07	0.01	0.083 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	87.86	26.79	70.75
TOTAL RAINFALL (mm)=	89.86	89.86	89.86
RUNOFF COEFFICIENT =	0.98	0.30	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0150):	0.31	0.062	12.23	59.75
	+ ID2= 2 (0160):	0.34	0.083	12.23	70.75
	ID = 3 (0162):	0.65	0.144	12.23	65.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0122):	0.82	0.144	12.23	58.79
	+ ID2= 2 (0162):	0.65	0.144	12.23	65.51
	ID = 3 (0167):	1.47	0.288	12.23	61.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0140)	Area (ha)= 0.11				
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.08	0.03
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	27.08	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.44	12.167	109.99	18.23	1.62
0.067	0.00	6.133	1.44	12.200	109.99	18.27	1.62
0.100	0.00	6.167	1.44	12.233	109.99	18.30	1.62
0.133	0.00	6.200	1.44	12.267	61.32	18.33	1.62
0.167	0.00	6.233	1.44	12.300	12.94	18.37	1.62
0.200	0.00	6.267	1.53	12.333	12.94	18.40	1.62
0.233	0.00	6.300	1.62	12.367	12.94	18.43	1.62
0.267	0.49	6.333	1.62	12.400	12.94	18.47	1.62
0.300	0.99	6.367	1.62	12.433	12.94	18.50	1.62
0.333	0.99	6.400	1.62	12.467	12.94	18.53	1.62
0.367	0.99	6.433	1.62	12.500	12.94	18.57	1.62
0.400	0.99	6.467	1.62	12.533	12.94	18.60	1.62
0.433	0.99	6.500	1.62	12.567	12.94	18.63	1.62
0.467	0.99	6.533	1.62	12.600	12.94	18.67	1.62
0.500	0.99	6.567	1.62	12.633	12.94	18.70	1.62
0.533	0.99	6.600	1.62	12.667	12.94	18.73	1.62
0.567	0.99	6.633	1.62	12.700	12.94	18.77	1.62
0.600	0.99	6.667	1.62	12.733	12.94	18.80	1.62
0.633	0.99	6.700	1.62	12.767	9.78	18.83	1.62
0.667	0.99	6.733	1.62	12.800	6.65	18.87	1.62
0.700	0.99	6.767	1.62	12.833	6.65	18.90	1.62
0.733	0.99	6.800	1.62	12.867	6.65	18.93	1.62
0.767	0.99	6.833	1.62	12.900	6.65	18.97	1.62
0.800	0.99	6.867	1.62	12.933	6.65	19.00	1.62
0.833	0.99	6.900	1.62	12.967	6.65	19.03	1.62
0.867	0.99	6.933	1.62	13.000	6.65	19.07	1.62
0.900	0.99	6.967	1.62	13.033	6.65	19.10	1.62
0.933	0.99	7.000	1.62	13.067	6.65	19.13	1.62
0.967	0.99	7.033	1.62	13.100	6.65	19.17	1.62
1.000	0.99	7.067	1.62	13.133	6.65	19.20	1.62
1.033	0.99	7.100	1.62	13.167	6.65	19.23	1.62
1.067	0.99	7.133	1.62	13.200	6.65	19.27	1.62
1.100	0.99	7.167	1.62	13.233	6.65	19.30	1.62
1.133	0.99	7.200	1.62	13.267	5.75	19.33	1.62
1.167	0.99	7.233	1.62	13.300	4.85	19.37	1.62

1.200	0.99	7.267	1.80	13.333	4.85	19.40	1.62
1.233	0.99	7.300	1.98	13.367	4.85	19.43	1.62
1.267	0.99	7.333	1.98	13.400	4.85	19.47	1.62
1.300	0.99	7.367	1.98	13.433	4.85	19.50	1.62
1.333	0.99	7.400	1.98	13.467	4.85	19.53	1.62
1.367	0.99	7.433	1.98	13.500	4.85	19.57	1.62
1.400	0.99	7.467	1.98	13.533	4.85	19.60	1.62
1.433	0.99	7.500	1.98	13.567	4.85	19.63	1.62
1.467	0.99	7.533	1.98	13.600	4.85	19.67	1.62
1.500	0.99	7.567	1.98	13.633	4.85	19.70	1.62
1.533	0.99	7.600	1.98	13.667	4.85	19.73	1.62
1.567	0.99	7.633	1.98	13.700	4.85	19.77	1.62
1.600	0.99	7.667	1.98	13.733	4.85	19.80	1.62
1.633	0.99	7.700	1.98	13.767	4.31	19.83	1.62
1.667	0.99	7.733	1.98	13.800	3.77	19.87	1.62
1.700	0.99	7.767	1.98	13.833	3.77	19.90	1.62
1.733	0.99	7.800	1.98	13.867	3.77	19.93	1.62
1.767	0.99	7.833	1.98	13.900	3.77	19.97	1.62
1.800	0.99	7.867	1.98	13.933	3.77	20.00	1.62
1.833	0.99	7.900	1.98	13.967	3.77	20.03	1.62
1.867	0.99	7.933	1.98	14.000	3.77	20.07	1.62
1.900	0.99	7.967	1.98	14.033	3.77	20.10	1.62
1.933	0.99	8.000	1.98	14.067	3.77	20.13	1.62
1.967	0.99	8.033	1.98	14.100	3.77	20.17	1.62
2.000	0.99	8.067	1.98	14.133	3.77	20.20	1.62
2.033	0.99	8.100	1.98	14.167	3.77	20.23	1.62
2.067	0.99	8.133	1.98	14.200	3.77	20.27	1.35
2.100	0.99	8.167	1.98	14.233	3.77	20.30	1.08
2.133	0.99	8.200	1.98	14.267	3.23	20.33	1.08
2.167	0.99	8.233	1.98	14.300	2.70	20.37	1.08
2.200	0.99	8.267	2.16	14.333	2.70	20.40	1.08
2.233	0.99	8.300	2.34	14.367	2.70	20.43	1.08
2.267	1.08	8.333	2.34	14.400	2.70	20.47	1.08
2.300	1.17	8.367	2.34	14.433	2.70	20.50	1.08
2.333	1.17	8.400	2.34	14.467	2.70	20.53	1.08
2.367	1.17	8.433	2.34	14.500	2.70	20.57	1.08
2.400	1.17	8.467	2.34	14.533	2.70	20.60	1.08
2.433	1.17	8.500	2.34	14.567	2.70	20.63	1.08
2.467	1.17	8.533	2.34	14.600	2.70	20.67	1.08
2.500	1.17	8.567	2.34	14.633	2.70	20.70	1.08
2.533	1.17	8.600	2.34	14.667	2.70	20.73	1.08
2.567	1.17	8.633	2.34	14.700	2.70	20.77	1.08
2.600	1.17	8.667	2.34	14.733	2.70	20.80	1.08
2.633	1.17	8.700	2.34	14.767	2.70	20.83	1.08
2.667	1.17	8.733	2.34	14.800	2.70	20.87	1.08
2.700	1.17	8.767	2.43	14.833	2.70	20.90	1.08
2.733	1.17	8.800	2.52	14.867	2.70	20.93	1.08
2.767	1.17	8.833	2.52	14.900	2.70	20.97	1.08
2.800	1.17	8.867	2.52	14.933	2.70	21.00	1.08

2.833	1.17	8.900	2.52	14.967	2.70	21.03	1.08
2.867	1.17	8.933	2.52	15.000	2.70	21.07	1.08
2.900	1.17	8.967	2.52	15.033	2.70	21.10	1.08
2.933	1.17	9.000	2.52	15.067	2.70	21.13	1.08
2.967	1.17	9.033	2.52	15.100	2.70	21.17	1.08
3.000	1.17	9.067	2.52	15.133	2.70	21.20	1.08
3.033	1.17	9.100	2.52	15.167	2.70	21.23	1.08
3.067	1.17	9.133	2.52	15.200	2.70	21.27	1.08
3.100	1.17	9.167	2.52	15.233	2.70	21.30	1.08
3.133	1.17	9.200	2.52	15.267	2.70	21.33	1.08
3.167	1.17	9.233	2.52	15.300	2.70	21.37	1.08
3.200	1.17	9.267	2.70	15.333	2.70	21.40	1.08
3.233	1.17	9.300	2.88	15.367	2.70	21.43	1.08
3.267	1.17	9.333	2.88	15.400	2.70	21.47	1.08
3.300	1.17	9.367	2.88	15.433	2.70	21.50	1.08
3.333	1.17	9.400	2.88	15.467	2.70	21.53	1.08
3.367	1.17	9.433	2.88	15.500	2.70	21.57	1.08
3.400	1.17	9.467	2.88	15.533	2.70	21.60	1.08
3.433	1.17	9.500	2.88	15.567	2.70	21.63	1.08
3.467	1.17	9.533	2.88	15.600	2.70	21.67	1.08
3.500	1.17	9.567	2.88	15.633	2.70	21.70	1.08
3.533	1.17	9.600	2.88	15.667	2.70	21.73	1.08
3.567	1.17	9.633	2.88	15.700	2.70	21.77	1.08
3.600	1.17	9.667	2.88	15.733	2.70	21.80	1.08
3.633	1.17	9.700	2.88	15.767	2.70	21.83	1.08
3.667	1.17	9.733	2.88	15.800	2.70	21.87	1.08
3.700	1.17	9.767	3.06	15.833	2.70	21.90	1.08
3.733	1.17	9.800	3.23	15.867	2.70	21.93	1.08
3.767	1.17	9.833	3.23	15.900	2.70	21.97	1.08
3.800	1.17	9.867	3.23	15.933	2.70	22.00	1.08
3.833	1.17	9.900	3.23	15.967	2.70	22.03	1.08
3.867	1.17	9.933	3.23	16.000	2.70	22.07	1.08
3.900	1.17	9.967	3.23	16.033	2.70	22.10	1.08
3.933	1.17	10.000	3.24	16.067	2.70	22.13	1.08
3.967	1.17	10.033	3.23	16.100	2.70	22.17	1.08
4.000	1.17	10.067	3.23	16.133	2.70	22.20	1.08
4.033	1.17	10.100	3.23	16.167	2.70	22.23	1.08
4.067	1.17	10.133	3.23	16.200	2.70	22.27	1.08
4.100	1.17	10.167	3.23	16.233	2.70	22.30	1.08
4.133	1.17	10.200	3.23	16.267	2.15	22.33	1.08
4.167	1.17	10.233	3.23	16.300	1.62	22.37	1.08
4.200	1.17	10.267	3.68	16.333	1.62	22.40	1.08
4.233	1.17	10.300	4.13	16.367	1.62	22.43	1.08
4.267	1.30	10.333	4.13	16.400	1.62	22.47	1.08
4.300	1.44	10.367	4.13	16.433	1.62	22.50	1.08
4.333	1.44	10.400	4.13	16.467	1.62	22.53	1.08
4.367	1.44	10.433	4.13	16.500	1.62	22.57	1.08
4.400	1.44	10.467	4.13	16.533	1.62	22.60	1.08
4.433	1.44	10.500	4.13	16.567	1.62	22.63	1.08

4.467	1.44	10.533	4.13	16.600	1.62	22.67	1.08
4.500	1.44	10.567	4.13	16.633	1.62	22.70	1.08
4.533	1.44	10.600	4.13	16.667	1.62	22.73	1.08
4.567	1.44	10.633	4.13	16.700	1.62	22.77	1.08
4.600	1.44	10.667	4.13	16.733	1.62	22.80	1.08
4.633	1.44	10.700	4.13	16.767	1.62	22.83	1.08
4.667	1.44	10.733	4.13	16.800	1.62	22.87	1.08
4.700	1.44	10.767	4.85	16.833	1.62	22.90	1.08
4.733	1.44	10.800	5.57	16.867	1.62	22.93	1.08
4.767	1.44	10.833	5.57	16.900	1.62	22.97	1.08
4.800	1.44	10.867	5.57	16.933	1.62	23.00	1.08
4.833	1.44	10.900	5.57	16.967	1.62	23.03	1.08
4.867	1.44	10.933	5.57	17.000	1.62	23.07	1.08
4.900	1.44	10.967	5.57	17.033	1.62	23.10	1.08
4.933	1.44	11.000	5.57	17.067	1.62	23.13	1.08
4.967	1.44	11.033	5.57	17.100	1.62	23.17	1.08
5.000	1.44	11.067	5.57	17.133	1.62	23.20	1.08
5.033	1.44	11.100	5.57	17.167	1.62	23.23	1.08
5.067	1.44	11.133	5.57	17.200	1.62	23.27	1.08
5.100	1.44	11.167	5.57	17.233	1.62	23.30	1.08
5.133	1.44	11.200	5.57	17.267	1.62	23.33	1.08
5.167	1.44	11.233	5.57	17.300	1.62	23.37	1.08
5.200	1.44	11.267	7.10	17.333	1.62	23.40	1.08
5.233	1.44	11.300	8.63	17.367	1.62	23.43	1.08
5.267	1.44	11.333	8.63	17.400	1.62	23.47	1.08
5.300	1.44	11.367	8.63	17.433	1.62	23.50	1.08
5.333	1.44	11.400	8.63	17.467	1.62	23.53	1.08
5.367	1.44	11.433	8.63	17.500	1.62	23.57	1.08
5.400	1.44	11.467	8.63	17.533	1.62	23.60	1.08
5.433	1.44	11.500	8.63	17.567	1.62	23.63	1.08
5.467	1.44	11.533	8.63	17.600	1.62	23.67	1.08
5.500	1.44	11.567	8.63	17.633	1.62	23.70	1.08
5.533	1.44	11.600	8.63	17.667	1.62	23.73	1.08
5.567	1.44	11.633	8.63	17.700	1.62	23.77	1.08
5.600	1.44	11.667	8.63	17.733	1.62	23.80	1.08
5.633	1.44	11.700	8.63	17.767	1.62	23.83	1.08
5.667	1.44	11.733	8.63	17.800	1.62	23.87	1.08
5.700	1.44	11.767	17.64	17.833	1.62	23.90	1.08
5.733	1.44	11.800	26.60	17.867	1.62	23.93	1.08
5.767	1.44	11.833	26.60	17.900	1.62	23.97	1.08
5.800	1.44	11.867	26.60	17.933	1.62	24.00	1.08
5.833	1.44	11.900	26.60	17.967	1.62	24.03	1.08
5.867	1.44	11.933	26.60	18.000	1.62	24.07	1.08
5.900	1.44	11.967	26.60	18.033	1.62	24.10	1.08
5.933	1.44	12.000	26.72	18.067	1.62	24.13	1.08
5.967	1.44	12.033	109.99	18.100	1.62	24.17	1.08
6.000	1.44	12.067	109.99	18.133	1.62	24.20	1.08
6.033	1.44	12.100	109.99	18.167	1.62	24.23	1.08
6.067	1.44	12.133	109.99	18.200	1.62	24.27	0.54

Max.Eff.Inten.(mm/hr)=	109.99	37.99	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.12 (ii)	5.41 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.028 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	87.86	26.79	73.19
TOTAL RAINFALL (mm)=	89.86	89.86	89.86
RUNOFF COEFFICIENT =	0.98	0.30	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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      V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M  M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\03cc6316-c58c-4fb4-9bb4-c2cbaeeb2a0a\sc
Summary filename:

C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\03cc6316-c58c-4fb4-9bb4-c2cbaeeb2a0a\sc

DATE: 01-16-2026 TIME: 04:30:13

USER:

COMMENTS: _____

****
** SIMULATION : 24hr SCS 5yr **
****

READ STORM	Filename: C:\Users\Yuan.Yuan\AppData\Local\Temp\56b3036e-ed23-4339-a443-7ff2161d9767\ab480703
Ptotal= 61.24 mm	Comments: 24hr SCS 5yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.10	12.50	8.82	18.75	1.10
0.25	0.67	6.50	1.10	12.75	4.53	19.00	1.10
0.50	0.67	6.75	1.10	13.00	4.53	19.25	1.10
0.75	0.67	7.00	1.10	13.25	3.31	19.50	1.10
1.00	0.67	7.25	1.35	13.50	3.31	19.75	1.10
1.25	0.67	7.50	1.35	13.75	2.57	20.00	1.10
1.50	0.67	7.75	1.35	14.00	2.57	20.25	0.73
1.75	0.67	8.00	1.35	14.25	1.84	20.50	0.73
2.00	0.67	8.25	1.59	14.50	1.84	20.75	0.73
2.25	0.80	8.50	1.59	14.75	1.84	21.00	0.73
2.50	0.80	8.75	1.71	15.00	1.84	21.25	0.73
2.75	0.80	9.00	1.71	15.25	1.84	21.50	0.73
3.00	0.80	9.25	1.96	15.50	1.84	21.75	0.73
3.25	0.80	9.50	1.96	15.75	1.84	22.00	0.73
3.50	0.80	9.75	2.20	16.00	1.84	22.25	0.73
3.75	0.80	10.00	2.20	16.25	1.10	22.50	0.73
4.00	0.80	10.25	2.82	16.50	1.10	22.75	0.73
4.25	0.98	10.50	2.82	16.75	1.10	23.00	0.73
4.50	0.98	10.75	3.80	17.00	1.10	23.25	0.73
4.75	0.98	11.00	3.80	17.25	1.10	23.50	0.73
5.00	0.98	11.25	5.88	17.50	1.10	23.75	0.73

5.25	0.98	11.50	5.88	17.75	1.10	24.00	0.73
5.50	0.98	11.75	18.13	18.00	1.10		
5.75	0.98	12.00	74.96	18.25	1.10		
6.00	0.98	12.25	8.82	18.50	1.10		

CALIB		
STANDHYD (0120)	Area (ha)=	0.11
ID= 1 DT= 2.0 min	Total Imp(%)=	77.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.98	12.167	74.96	18.23	1.10
0.067	0.00	6.133	0.98	12.200	74.96	18.27	1.10
0.100	0.00	6.167	0.98	12.233	74.96	18.30	1.10
0.133	0.00	6.200	0.98	12.267	41.79	18.33	1.10
0.167	0.00	6.233	0.98	12.300	8.82	18.37	1.10
0.200	0.00	6.267	1.04	12.333	8.82	18.40	1.10
0.233	0.00	6.300	1.10	12.367	8.82	18.43	1.10
0.267	0.34	6.333	1.10	12.400	8.82	18.47	1.10
0.300	0.67	6.367	1.10	12.433	8.82	18.50	1.10
0.333	0.67	6.400	1.10	12.467	8.82	18.53	1.10
0.367	0.67	6.433	1.10	12.500	8.82	18.57	1.10
0.400	0.67	6.467	1.10	12.533	8.82	18.60	1.10
0.433	0.67	6.500	1.10	12.567	8.82	18.63	1.10
0.467	0.67	6.533	1.10	12.600	8.82	18.67	1.10
0.500	0.67	6.567	1.10	12.633	8.82	18.70	1.10
0.533	0.67	6.600	1.10	12.667	8.82	18.73	1.10
0.567	0.67	6.633	1.10	12.700	8.82	18.77	1.10
0.600	0.67	6.667	1.10	12.733	8.82	18.80	1.10
0.633	0.67	6.700	1.10	12.767	6.67	18.83	1.10
0.667	0.67	6.733	1.10	12.800	4.53	18.87	1.10
0.700	0.67	6.767	1.10	12.833	4.53	18.90	1.10
0.733	0.67	6.800	1.10	12.867	4.53	18.93	1.10
0.767	0.67	6.833	1.10	12.900	4.53	18.97	1.10
0.800	0.67	6.867	1.10	12.933	4.53	19.00	1.10

0.833	0.67	6.900	1.10	12.967	4.53	19.03	1.10
0.867	0.67	6.933	1.10	13.000	4.53	19.07	1.10
0.900	0.67	6.967	1.10	13.033	4.53	19.10	1.10
0.933	0.67	7.000	1.10	13.067	4.53	19.13	1.10
0.967	0.67	7.033	1.10	13.100	4.53	19.17	1.10
1.000	0.67	7.067	1.10	13.133	4.53	19.20	1.10
1.033	0.67	7.100	1.10	13.167	4.53	19.23	1.10
1.067	0.67	7.133	1.10	13.200	4.53	19.27	1.10
1.100	0.67	7.167	1.10	13.233	4.53	19.30	1.10
1.133	0.67	7.200	1.10	13.267	3.92	19.33	1.10
1.167	0.67	7.233	1.10	13.300	3.31	19.37	1.10
1.200	0.67	7.267	1.22	13.333	3.31	19.40	1.10
1.233	0.67	7.300	1.35	13.367	3.31	19.43	1.10
1.267	0.67	7.333	1.35	13.400	3.31	19.47	1.10
1.300	0.67	7.367	1.35	13.433	3.31	19.50	1.10
1.333	0.67	7.400	1.35	13.467	3.31	19.53	1.10
1.367	0.67	7.433	1.35	13.500	3.31	19.57	1.10
1.400	0.67	7.467	1.35	13.533	3.31	19.60	1.10
1.433	0.67	7.500	1.35	13.567	3.31	19.63	1.10
1.467	0.67	7.533	1.35	13.600	3.31	19.67	1.10
1.500	0.67	7.567	1.35	13.633	3.31	19.70	1.10
1.533	0.67	7.600	1.35	13.667	3.31	19.73	1.10
1.567	0.67	7.633	1.35	13.700	3.31	19.77	1.10
1.600	0.67	7.667	1.35	13.733	3.31	19.80	1.10
1.633	0.67	7.700	1.35	13.767	2.94	19.83	1.10
1.667	0.67	7.733	1.35	13.800	2.57	19.87	1.10
1.700	0.67	7.767	1.35	13.833	2.57	19.90	1.10
1.733	0.67	7.800	1.35	13.867	2.57	19.93	1.10
1.767	0.67	7.833	1.35	13.900	2.57	19.97	1.10
1.800	0.67	7.867	1.35	13.933	2.57	20.00	1.10
1.833	0.67	7.900	1.35	13.967	2.57	20.03	1.10
1.867	0.67	7.933	1.35	14.000	2.57	20.07	1.10
1.900	0.67	7.967	1.35	14.033	2.57	20.10	1.10
1.933	0.67	8.000	1.35	14.067	2.57	20.13	1.10
1.967	0.67	8.033	1.35	14.100	2.57	20.17	1.10
2.000	0.67	8.067	1.35	14.133	2.57	20.20	1.10
2.033	0.67	8.100	1.35	14.167	2.57	20.23	1.10
2.067	0.67	8.133	1.35	14.200	2.57	20.27	0.92
2.100	0.67	8.167	1.35	14.233	2.57	20.30	0.73
2.133	0.67	8.200	1.35	14.267	2.20	20.33	0.73
2.167	0.67	8.233	1.35	14.300	1.84	20.37	0.73
2.200	0.67	8.267	1.47	14.333	1.84	20.40	0.73
2.233	0.67	8.300	1.59	14.367	1.84	20.43	0.73
2.267	0.73	8.333	1.59	14.400	1.84	20.47	0.73
2.300	0.80	8.367	1.59	14.433	1.84	20.50	0.73
2.333	0.80	8.400	1.59	14.467	1.84	20.53	0.73
2.367	0.80	8.433	1.59	14.500	1.84	20.57	0.73
2.400	0.80	8.467	1.59	14.533	1.84	20.60	0.73
2.433	0.80	8.500	1.59	14.567	1.84	20.63	0.73

SCS 24 hr_Exsting Conditions

2.467	0.80	8.533	1.59	14.600	1.84	20.67	0.73
2.500	0.80	8.567	1.59	14.633	1.84	20.70	0.73
2.533	0.80	8.600	1.59	14.667	1.84	20.73	0.73
2.567	0.80	8.633	1.59	14.700	1.84	20.77	0.73
2.600	0.80	8.667	1.59	14.733	1.84	20.80	0.73
2.633	0.80	8.700	1.59	14.767	1.84	20.83	0.73
2.667	0.80	8.733	1.59	14.800	1.84	20.87	0.73
2.700	0.80	8.767	1.65	14.833	1.84	20.90	0.73
2.733	0.80	8.800	1.71	14.867	1.84	20.93	0.73
2.767	0.80	8.833	1.71	14.900	1.84	20.97	0.73
2.800	0.80	8.867	1.71	14.933	1.84	21.00	0.73
2.833	0.80	8.900	1.71	14.967	1.84	21.03	0.73
2.867	0.80	8.933	1.71	15.000	1.84	21.07	0.73
2.900	0.80	8.967	1.71	15.033	1.84	21.10	0.73
2.933	0.80	9.000	1.71	15.067	1.84	21.13	0.73
2.967	0.80	9.033	1.71	15.100	1.84	21.17	0.73
3.000	0.80	9.067	1.71	15.133	1.84	21.20	0.73
3.033	0.80	9.100	1.71	15.167	1.84	21.23	0.73
3.067	0.80	9.133	1.71	15.200	1.84	21.27	0.73
3.100	0.80	9.167	1.71	15.233	1.84	21.30	0.73
3.133	0.80	9.200	1.71	15.267	1.84	21.33	0.73
3.167	0.80	9.233	1.71	15.300	1.84	21.37	0.73
3.200	0.80	9.267	1.84	15.333	1.84	21.40	0.73
3.233	0.80	9.300	1.96	15.367	1.84	21.43	0.73
3.267	0.80	9.333	1.96	15.400	1.84	21.47	0.73
3.300	0.80	9.367	1.96	15.433	1.84	21.50	0.73
3.333	0.80	9.400	1.96	15.467	1.84	21.53	0.73
3.367	0.80	9.433	1.96	15.500	1.84	21.57	0.73
3.400	0.80	9.467	1.96	15.533	1.84	21.60	0.73
3.433	0.80	9.500	1.96	15.567	1.84	21.63	0.73
3.467	0.80	9.533	1.96	15.600	1.84	21.67	0.73
3.500	0.80	9.567	1.96	15.633	1.84	21.70	0.73
3.533	0.80	9.600	1.96	15.667	1.84	21.73	0.73
3.567	0.80	9.633	1.96	15.700	1.84	21.77	0.73
3.600	0.80	9.667	1.96	15.733	1.84	21.80	0.73
3.633	0.80	9.700	1.96	15.767	1.84	21.83	0.73
3.667	0.80	9.733	1.96	15.800	1.84	21.87	0.73
3.700	0.80	9.767	2.08	15.833	1.84	21.90	0.73
3.733	0.80	9.800	2.20	15.867	1.84	21.93	0.73
3.767	0.80	9.833	2.20	15.900	1.84	21.97	0.73
3.800	0.80	9.867	2.20	15.933	1.84	22.00	0.73
3.833	0.80	9.900	2.20	15.967	1.84	22.03	0.73
3.867	0.80	9.933	2.20	16.000	1.84	22.07	0.73
3.900	0.80	9.967	2.20	16.033	1.84	22.10	0.73
3.933	0.80	10.000	2.20	16.067	1.84	22.13	0.73
3.967	0.80	10.033	2.20	16.100	1.84	22.17	0.73
4.000	0.80	10.067	2.20	16.133	1.84	22.20	0.73
4.033	0.80	10.100	2.20	16.167	1.84	22.23	0.73
4.067	0.80	10.133	2.20	16.200	1.84	22.27	0.73

SCS 24 hr_Exsting Conditions

4.100	0.80	10.167	2.20	16.233	1.84	22.30	0.73
4.133	0.80	10.200	2.20	16.267	1.47	22.33	0.73
4.167	0.80	10.233	2.20	16.300	1.10	22.37	0.73
4.200	0.80	10.267	2.51	16.333	1.10	22.40	0.73
4.233	0.80	10.300	2.82	16.367	1.10	22.43	0.73
4.267	0.89	10.333	2.82	16.400	1.10	22.47	0.73
4.300	0.98	10.367	2.82	16.433	1.10	22.50	0.73
4.333	0.98	10.400	2.82	16.467	1.10	22.53	0.73
4.367	0.98	10.433	2.82	16.500	1.10	22.57	0.73
4.400	0.98	10.467	2.82	16.533	1.10	22.60	0.73
4.433	0.98	10.500	2.82	16.567	1.10	22.63	0.73
4.467	0.98	10.533	2.82	16.600	1.10	22.67	0.73
4.500	0.98	10.567	2.82	16.633	1.10	22.70	0.73
4.533	0.98	10.600	2.82	16.667	1.10	22.73	0.73
4.567	0.98	10.633	2.82	16.700	1.10	22.77	0.73
4.600	0.98	10.667	2.82	16.733	1.10	22.80	0.73
4.633	0.98	10.700	2.82	16.767	1.10	22.83	0.73
4.667	0.98	10.733	2.82	16.800	1.10	22.87	0.73
4.700	0.98	10.767	3.31	16.833	1.10	22.90	0.73
4.733	0.98	10.800	3.80	16.867	1.10	22.93	0.73
4.767	0.98	10.833	3.80	16.900	1.10	22.97	0.73
4.800	0.98	10.867	3.80	16.933	1.10	23.00	0.73
4.833	0.98	10.900	3.80	16.967	1.10	23.03	0.73
4.867	0.98	10.933	3.80	17.000	1.10	23.07	0.73
4.900	0.98	10.967	3.80	17.033	1.10	23.10	0.73
4.933	0.98	11.000	3.80	17.067	1.10	23.13	0.73
4.967	0.98	11.033	3.80	17.100	1.10	23.17	0.73
5.000	0.98	11.067	3.80	17.133	1.10	23.20	0.73
5.033	0.98	11.100	3.80	17.167	1.10	23.23	0.73
5.067	0.98	11.133	3.80	17.200	1.10	23.27	0.73
5.100	0.98	11.167	3.80	17.233	1.10	23.30	0.73
5.133	0.98	11.200	3.80	17.267	1.10	23.33	0.73
5.167	0.98	11.233	3.80	17.300	1.10	23.37	0.73
5.200	0.98	11.267	4.84	17.333	1.10	23.40	0.73
5.233	0.98	11.300	5.88	17.367	1.10	23.43	0.73
5.267	0.98	11.333	5.88	17.400	1.10	23.47	0.73
5.300	0.98	11.367	5.88	17.433	1.10	23.50	0.73
5.333	0.98	11.400	5.88	17.467	1.10	23.53	0.73
5.367	0.98	11.433	5.88	17.500	1.10	23.57	0.73
5.400	0.98	11.467	5.88	17.533	1.10	23.60	0.73
5.433	0.98	11.500	5.88	17.567	1.10	23.63	0.73
5.467	0.98	11.533	5.88	17.600	1.10	23.67	0.73
5.500	0.98	11.567	5.88	17.633	1.10	23.70	0.73
5.533	0.98	11.600	5.88	17.667	1.10	23.73	0.73
5.567	0.98	11.633	5.88	17.700	1.10	23.77	0.73
5.600	0.98	11.667	5.88	17.733	1.10	23.80	0.73
5.633	0.98	11.700	5.88	17.767	1.10	23.83	0.73
5.667	0.98	11.733	5.88	17.800	1.10	23.87	0.73
5.700	0.98	11.767	12.02	17.833	1.10	23.90	0.73

SCS 24 hr_Exsting Conditions

5.733	0.98	11.800	18.13	17.867	1.10	23.93	0.73
5.767	0.98	11.833	18.13	17.900	1.10	23.97	0.73
5.800	0.98	11.867	18.13	17.933	1.10	24.00	0.73
5.833	0.98	11.900	18.13	17.967	1.10	24.03	0.73
5.867	0.98	11.933	18.13	18.000	1.10	24.07	0.73
5.900	0.98	11.967	18.13	18.033	1.10	24.10	0.73
5.933	0.98	12.000	18.21	18.067	1.10	24.13	0.73
5.967	0.98	12.033	74.96	18.100	1.10	24.17	0.73
6.000	0.98	12.067	74.96	18.133	1.10	24.20	0.73
6.033	0.98	12.100	74.96	18.167	1.10	24.23	0.73
6.067	0.98	12.133	74.96	18.200	1.10	24.27	0.37

Max.Eff.Inten.(mm/hr)=	74.96	28.45	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.31 (ii)	6.19 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.48	0.17	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.019 (iii)
TIME TO PEAK (hrs)=	12.23	12.27	12.23
RUNOFF VOLUME (mm)=	59.24	19.77	50.15
TOTAL RAINFALL (mm)=	61.24	61.24	61.24
RUNOFF COEFFICIENT =	0.97	0.32	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0110)	Area (ha)=	0.71	
ID= 1 DT= 2.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.45
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	68.80	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

SCS 24 hr_Exsting Conditions

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.98	12.167	74.96	18.23	1.10
0.067	0.00	6.133	0.98	12.200	74.96	18.27	1.10
0.100	0.00	6.167	0.98	12.233	74.96	18.30	1.10
0.133	0.00	6.200	0.98	12.267	41.79	18.33	1.10
0.167	0.00	6.233	0.98	12.300	8.82	18.37	1.10
0.200	0.00	6.267	1.04	12.333	8.82	18.40	1.10
0.233	0.00	6.300	1.10	12.367	8.82	18.43	1.10
0.267	0.34	6.333	1.10	12.400	8.82	18.47	1.10
0.300	0.67	6.367	1.10	12.433	8.82	18.50	1.10
0.333	0.67	6.400	1.10	12.467	8.82	18.53	1.10
0.367	0.67	6.433	1.10	12.500	8.82	18.57	1.10
0.400	0.67	6.467	1.10	12.533	8.82	18.60	1.10
0.433	0.67	6.500	1.10	12.567	8.82	18.63	1.10
0.467	0.67	6.533	1.10	12.600	8.82	18.67	1.10
0.500	0.67	6.567	1.10	12.633	8.82	18.70	1.10
0.533	0.67	6.600	1.10	12.667	8.82	18.73	1.10
0.567	0.67	6.633	1.10	12.700	8.82	18.77	1.10
0.600	0.67	6.667	1.10	12.733	8.82	18.80	1.10
0.633	0.67	6.700	1.10	12.767	6.67	18.83	1.10
0.667	0.67	6.733	1.10	12.800	4.53	18.87	1.10
0.700	0.67	6.767	1.10	12.833	4.53	18.90	1.10
0.733	0.67	6.800	1.10	12.867	4.53	18.93	1.10
0.767	0.67	6.833	1.10	12.900	4.53	18.97	1.10
0.800	0.67	6.867	1.10	12.933	4.53	19.00	1.10
0.833	0.67	6.900	1.10	12.967	4.53	19.03	1.10
0.867	0.67	6.933	1.10	13.000	4.53	19.07	1.10
0.900	0.67	6.967	1.10	13.033	4.53	19.10	1.10
0.933	0.67	7.000	1.10	13.067	4.53	19.13	1.10
0.967	0.67	7.033	1.10	13.100	4.53	19.17	1.10
1.000	0.67	7.067	1.10	13.133	4.53	19.20	1.10
1.033	0.67	7.100	1.10	13.167	4.53	19.23	1.10
1.067	0.67	7.133	1.10	13.200	4.53	19.27	1.10
1.100	0.67	7.167	1.10	13.233	4.53	19.30	1.10
1.133	0.67	7.200	1.10	13.267	3.92	19.33	1.10
1.167	0.67	7.233	1.10	13.300	3.31	19.37	1.10
1.200	0.67	7.267	1.22	13.333	3.31	19.40	1.10
1.233	0.67	7.300	1.35	13.367	3.31	19.43	1.10
1.267	0.67	7.333	1.35	13.400	3.31	19.47	1.10
1.300	0.67	7.367	1.35	13.433	3.31	19.50	1.10
1.333	0.67	7.400	1.35	13.467	3.31	19.53	1.10
1.367	0.67	7.433	1.35	13.500	3.31	19.57	1.10
1.400	0.67	7.467	1.35	13.533	3.31	19.60	1.10
1.433	0.67	7.500	1.35	13.567	3.31	19.63	1.10
1.467	0.67	7.533	1.35	13.600	3.31	19.67	1.10
1.500	0.67	7.567	1.35	13.633	3.31	19.70	1.10
1.533	0.67	7.600	1.35	13.667	3.31	19.73	1.10
1.567	0.67	7.633	1.35	13.700	3.31	19.77	1.10

SCS 24 hr_Exsting Conditions

1.600	0.67	7.667	1.35	13.733	3.31	19.80	1.10
1.633	0.67	7.700	1.35	13.767	2.94	19.83	1.10
1.667	0.67	7.733	1.35	13.800	2.57	19.87	1.10
1.700	0.67	7.767	1.35	13.833	2.57	19.90	1.10
1.733	0.67	7.800	1.35	13.867	2.57	19.93	1.10
1.767	0.67	7.833	1.35	13.900	2.57	19.97	1.10
1.800	0.67	7.867	1.35	13.933	2.57	20.00	1.10
1.833	0.67	7.900	1.35	13.967	2.57	20.03	1.10
1.867	0.67	7.933	1.35	14.000	2.57	20.07	1.10
1.900	0.67	7.967	1.35	14.033	2.57	20.10	1.10
1.933	0.67	8.000	1.35	14.067	2.57	20.13	1.10
1.967	0.67	8.033	1.35	14.100	2.57	20.17	1.10
2.000	0.67	8.067	1.35	14.133	2.57	20.20	1.10
2.033	0.67	8.100	1.35	14.167	2.57	20.23	1.10
2.067	0.67	8.133	1.35	14.200	2.57	20.27	0.92
2.100	0.67	8.167	1.35	14.233	2.57	20.30	0.73
2.133	0.67	8.200	1.35	14.267	2.20	20.33	0.73
2.167	0.67	8.233	1.35	14.300	1.84	20.37	0.73
2.200	0.67	8.267	1.47	14.333	1.84	20.40	0.73
2.233	0.67	8.300	1.59	14.367	1.84	20.43	0.73
2.267	0.73	8.333	1.59	14.400	1.84	20.47	0.73
2.300	0.80	8.367	1.59	14.433	1.84	20.50	0.73
2.333	0.80	8.400	1.59	14.467	1.84	20.53	0.73
2.367	0.80	8.433	1.59	14.500	1.84	20.57	0.73
2.400	0.80	8.467	1.59	14.533	1.84	20.60	0.73
2.433	0.80	8.500	1.59	14.567	1.84	20.63	0.73
2.467	0.80	8.533	1.59	14.600	1.84	20.67	0.73
2.500	0.80	8.567	1.59	14.633	1.84	20.70	0.73
2.533	0.80	8.600	1.59	14.667	1.84	20.73	0.73
2.567	0.80	8.633	1.59	14.700	1.84	20.77	0.73
2.600	0.80	8.667	1.59	14.733	1.84	20.80	0.73
2.633	0.80	8.700	1.59	14.767	1.84	20.83	0.73
2.667	0.80	8.733	1.59	14.800	1.84	20.87	0.73
2.700	0.80	8.767	1.65	14.833	1.84	20.90	0.73
2.733	0.80	8.800	1.71	14.867	1.84	20.93	0.73
2.767	0.80	8.833	1.71	14.900	1.84	20.97	0.73
2.800	0.80	8.867	1.71	14.933	1.84	21.00	0.73
2.833	0.80	8.900	1.71	14.967	1.84	21.03	0.73
2.867	0.80	8.933	1.71	15.000	1.84	21.07	0.73
2.900	0.80	8.967	1.71	15.033	1.84	21.10	0.73
2.933	0.80	9.000	1.71	15.067	1.84	21.13	0.73
2.967	0.80	9.033	1.71	15.100	1.84	21.17	0.73
3.000	0.80	9.067	1.71	15.133	1.84	21.20	0.73
3.033	0.80	9.100	1.71	15.167	1.84	21.23	0.73
3.067	0.80	9.133	1.71	15.200	1.84	21.27	0.73
3.100	0.80	9.167	1.71	15.233	1.84	21.30	0.73
3.133	0.80	9.200	1.71	15.267	1.84	21.33	0.73
3.167	0.80	9.233	1.71	15.300	1.84	21.37	0.73
3.200	0.80	9.267	1.84	15.333	1.84	21.40	0.73

SCS 24 hr_Exsting Conditions

3.233	0.80	9.300	1.96	15.367	1.84	21.43	0.73
3.267	0.80	9.333	1.96	15.400	1.84	21.47	0.73
3.300	0.80	9.367	1.96	15.433	1.84	21.50	0.73
3.333	0.80	9.400	1.96	15.467	1.84	21.53	0.73
3.367	0.80	9.433	1.96	15.500	1.84	21.57	0.73
3.400	0.80	9.467	1.96	15.533	1.84	21.60	0.73
3.433	0.80	9.500	1.96	15.567	1.84	21.63	0.73
3.467	0.80	9.533	1.96	15.600	1.84	21.67	0.73
3.500	0.80	9.567	1.96	15.633	1.84	21.70	0.73
3.533	0.80	9.600	1.96	15.667	1.84	21.73	0.73
3.567	0.80	9.633	1.96	15.700	1.84	21.77	0.73
3.600	0.80	9.667	1.96	15.733	1.84	21.80	0.73
3.633	0.80	9.700	1.96	15.767	1.84	21.83	0.73
3.667	0.80	9.733	1.96	15.800	1.84	21.87	0.73
3.700	0.80	9.767	2.08	15.833	1.84	21.90	0.73
3.733	0.80	9.800	2.20	15.867	1.84	21.93	0.73
3.767	0.80	9.833	2.20	15.900	1.84	21.97	0.73
3.800	0.80	9.867	2.20	15.933	1.84	22.00	0.73
3.833	0.80	9.900	2.20	15.967	1.84	22.03	0.73
3.867	0.80	9.933	2.20	16.000	1.84	22.07	0.73
3.900	0.80	9.967	2.20	16.033	1.84	22.10	0.73
3.933	0.80	10.000	2.20	16.067	1.84	22.13	0.73
3.967	0.80	10.033	2.20	16.100	1.84	22.17	0.73
4.000	0.80	10.067	2.20	16.133	1.84	22.20	0.73
4.033	0.80	10.100	2.20	16.167	1.84	22.23	0.73
4.067	0.80	10.133	2.20	16.200	1.84	22.27	0.73
4.100	0.80	10.167	2.20	16.233	1.84	22.30	0.73
4.133	0.80	10.200	2.20	16.267	1.47	22.33	0.73
4.167	0.80	10.233	2.20	16.300	1.10	22.37	0.73
4.200	0.80	10.267	2.51	16.333	1.10	22.40	0.73
4.233	0.80	10.300	2.82	16.367	1.10	22.43	0.73
4.267	0.89	10.333	2.82	16.400	1.10	22.47	0.73
4.300	0.98	10.367	2.82	16.433	1.10	22.50	0.73
4.333	0.98	10.400	2.82	16.467	1.10	22.53	0.73
4.367	0.98	10.433	2.82	16.500	1.10	22.57	0.73
4.400	0.98	10.467	2.82	16.533	1.10	22.60	0.73
4.433	0.98	10.500	2.82	16.567	1.10	22.63	0.73
4.467	0.98	10.533	2.82	16.600	1.10	22.67	0.73
4.500	0.98	10.567	2.82	16.633	1.10	22.70	0.73
4.533	0.98	10.600	2.82	16.667	1.10	22.73	0.73
4.567	0.98	10.633	2.82	16.700	1.10	22.77	0.73
4.600	0.98	10.667	2.82	16.733	1.10	22.80	0.73
4.633	0.98	10.700	2.82	16.767	1.10	22.83	0.73
4.667	0.98	10.733	2.82	16.800	1.10	22.87	0.73
4.700	0.98	10.767	3.31	16.833	1.10	22.90	0.73
4.733	0.98	10.800	3.80	16.867	1.10	22.93	0.73
4.767	0.98	10.833	3.80	16.900	1.10	22.97	0.73
4.800	0.98	10.867	3.80	16.933	1.10	23.00	0.73
4.833	0.98	10.900	3.80	16.967	1.10	23.03	0.73

SCS 24 hr_Exsting Conditions

4.867	0.98	10.933	3.80	17.000	1.10	23.07	0.73
4.900	0.98	10.967	3.80	17.033	1.10	23.10	0.73
4.933	0.98	11.000	3.80	17.067	1.10	23.13	0.73
4.967	0.98	11.033	3.80	17.100	1.10	23.17	0.73
5.000	0.98	11.067	3.80	17.133	1.10	23.20	0.73
5.033	0.98	11.100	3.80	17.167	1.10	23.23	0.73
5.067	0.98	11.133	3.80	17.200	1.10	23.27	0.73
5.100	0.98	11.167	3.80	17.233	1.10	23.30	0.73
5.133	0.98	11.200	3.80	17.267	1.10	23.33	0.73
5.167	0.98	11.233	3.80	17.300	1.10	23.37	0.73
5.200	0.98	11.267	4.84	17.333	1.10	23.40	0.73
5.233	0.98	11.300	5.88	17.367	1.10	23.43	0.73
5.267	0.98	11.333	5.88	17.400	1.10	23.47	0.73
5.300	0.98	11.367	5.88	17.433	1.10	23.50	0.73
5.333	0.98	11.400	5.88	17.467	1.10	23.53	0.73
5.367	0.98	11.433	5.88	17.500	1.10	23.57	0.73
5.400	0.98	11.467	5.88	17.533	1.10	23.60	0.73
5.433	0.98	11.500	5.88	17.567	1.10	23.63	0.73
5.467	0.98	11.533	5.88	17.600	1.10	23.67	0.73
5.500	0.98	11.567	5.88	17.633	1.10	23.70	0.73
5.533	0.98	11.600	5.88	17.667	1.10	23.73	0.73
5.567	0.98	11.633	5.88	17.700	1.10	23.77	0.73
5.600	0.98	11.667	5.88	17.733	1.10	23.80	0.73
5.633	0.98	11.700	5.88	17.767	1.10	23.83	0.73
5.667	0.98	11.733	5.88	17.800	1.10	23.87	0.73
5.700	0.98	11.767	12.02	17.833	1.10	23.90	0.73
5.733	0.98	11.800	18.13	17.867	1.10	23.93	0.73
5.767	0.98	11.833	18.13	17.900	1.10	23.97	0.73
5.800	0.98	11.867	18.13	17.933	1.10	24.00	0.73
5.833	0.98	11.900	18.13	17.967	1.10	24.03	0.73
5.867	0.98	11.933	18.13	18.000	1.10	24.07	0.73
5.900	0.98	11.967	18.13	18.033	1.10	24.10	0.73
5.933	0.98	12.000	18.21	18.067	1.10	24.13	0.73
5.967	0.98	12.033	74.96	18.100	1.10	24.17	0.73
6.000	0.98	12.067	74.96	18.133	1.10	24.20	0.73
6.033	0.98	12.100	74.96	18.167	1.10	24.23	0.73
6.067	0.98	12.133	74.96	18.200	1.10	24.27	0.37

Max.Eff.Inten.(mm/hr)=	74.96	27.50	
over (min)	5.00	16.00	
Storage Coeff. (min)=	2.29 (ii)	14.12 (ii)	
Unit Hyd. Tpeak (min)=	4.00	16.00	
Unit Hyd. peak (cms)=	0.38	0.08	
			TOTALS
PEAK FLOW (cms)=	0.05	0.02	0.066 (iii)
TIME TO PEAK (hrs)=	12.23	12.40	12.23
RUNOFF VOLUME (mm)=	59.24	19.77	33.97
TOTAL RAINFALL (mm)=	61.24	61.24	61.24
RUNOFF COEFFICIENT =	0.97	0.32	0.55

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0110):	0.71	0.066	12.23	33.97
	+ ID2= 2 (0120):	0.11	0.019	12.23	50.15
	ID = 3 (0122):	0.82	0.085	12.23	36.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB / STANDHYD (0150)	Area (ha)= 0.31
ID= 1 DT= 2.0 min	Total Imp(%)= 54.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.14
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.46	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.98	12.167	74.96	18.23	1.10
0.067	0.00	6.133	0.98	12.200	74.96	18.27	1.10
0.100	0.00	6.167	0.98	12.233	74.96	18.30	1.10
0.133	0.00	6.200	0.98	12.267	41.79	18.33	1.10
0.167	0.00	6.233	0.98	12.300	8.82	18.37	1.10
0.200	0.00	6.267	1.04	12.333	8.82	18.40	1.10
0.233	0.00	6.300	1.10	12.367	8.82	18.43	1.10
0.267	0.34	6.333	1.10	12.400	8.82	18.47	1.10
0.300	0.67	6.367	1.10	12.433	8.82	18.50	1.10
0.333	0.67	6.400	1.10	12.467	8.82	18.53	1.10

0.367	0.67	6.433	1.10	12.500	8.82	18.57	1.10
0.400	0.67	6.467	1.10	12.533	8.82	18.60	1.10
0.433	0.67	6.500	1.10	12.567	8.82	18.63	1.10
0.467	0.67	6.533	1.10	12.600	8.82	18.67	1.10
0.500	0.67	6.567	1.10	12.633	8.82	18.70	1.10
0.533	0.67	6.600	1.10	12.667	8.82	18.73	1.10
0.567	0.67	6.633	1.10	12.700	8.82	18.77	1.10
0.600	0.67	6.667	1.10	12.733	8.82	18.80	1.10
0.633	0.67	6.700	1.10	12.767	6.67	18.83	1.10
0.667	0.67	6.733	1.10	12.800	4.53	18.87	1.10
0.700	0.67	6.767	1.10	12.833	4.53	18.90	1.10
0.733	0.67	6.800	1.10	12.867	4.53	18.93	1.10
0.767	0.67	6.833	1.10	12.900	4.53	18.97	1.10
0.800	0.67	6.867	1.10	12.933	4.53	19.00	1.10
0.833	0.67	6.900	1.10	12.967	4.53	19.03	1.10
0.867	0.67	6.933	1.10	13.000	4.53	19.07	1.10
0.900	0.67	6.967	1.10	13.033	4.53	19.10	1.10
0.933	0.67	7.000	1.10	13.067	4.53	19.13	1.10
0.967	0.67	7.033	1.10	13.100	4.53	19.17	1.10
1.000	0.67	7.067	1.10	13.133	4.53	19.20	1.10
1.033	0.67	7.100	1.10	13.167	4.53	19.23	1.10
1.067	0.67	7.133	1.10	13.200	4.53	19.27	1.10
1.100	0.67	7.167	1.10	13.233	4.53	19.30	1.10
1.133	0.67	7.200	1.10	13.267	3.92	19.33	1.10
1.167	0.67	7.233	1.10	13.300	3.31	19.37	1.10
1.200	0.67	7.267	1.22	13.333	3.31	19.40	1.10
1.233	0.67	7.300	1.35	13.367	3.31	19.43	1.10
1.267	0.67	7.333	1.35	13.400	3.31	19.47	1.10
1.300	0.67	7.367	1.35	13.433	3.31	19.50	1.10
1.333	0.67	7.400	1.35	13.467	3.31	19.53	1.10
1.367	0.67	7.433	1.35	13.500	3.31	19.57	1.10
1.400	0.67	7.467	1.35	13.533	3.31	19.60	1.10
1.433	0.67	7.500	1.35	13.567	3.31	19.63	1.10
1.467	0.67	7.533	1.35	13.600	3.31	19.67	1.10
1.500	0.67	7.567	1.35	13.633	3.31	19.70	1.10
1.533	0.67	7.600	1.35	13.667	3.31	19.73	1.10
1.567	0.67	7.633	1.35	13.700	3.31	19.77	1.10
1.600	0.67	7.667	1.35	13.733	3.31	19.80	1.10
1.633	0.67	7.700	1.35	13.767	2.94	19.83	1.10
1.667	0.67	7.733	1.35	13.800	2.57	19.87	1.10
1.700	0.67	7.767	1.35	13.833	2.57	19.90	1.10
1.733	0.67	7.800	1.35	13.867	2.57	19.93	1.10
1.767	0.67	7.833	1.35	13.900	2.57	19.97	1.10
1.800	0.67	7.867	1.35	13.933	2.57	20.00	1.10
1.833	0.67	7.900	1.35	13.967	2.57	20.03	1.10
1.867	0.67	7.933	1.35	14.000	2.57	20.07	1.10
1.900	0.67	7.967	1.35	14.033	2.57	20.10	1.10
1.933	0.67	8.000	1.35	14.067	2.57	20.13	1.10
1.967	0.67	8.033	1.35	14.100	2.57	20.17	1.10

2.000	0.67	8.067	1.35	14.133	2.57	20.20	1.10
2.033	0.67	8.100	1.35	14.167	2.57	20.23	1.10
2.067	0.67	8.133	1.35	14.200	2.57	20.27	0.92
2.100	0.67	8.167	1.35	14.233	2.57	20.30	0.73
2.133	0.67	8.200	1.35	14.267	2.20	20.33	0.73
2.167	0.67	8.233	1.35	14.300	1.84	20.37	0.73
2.200	0.67	8.267	1.47	14.333	1.84	20.40	0.73
2.233	0.67	8.300	1.59	14.367	1.84	20.43	0.73
2.267	0.73	8.333	1.59	14.400	1.84	20.47	0.73
2.300	0.80	8.367	1.59	14.433	1.84	20.50	0.73
2.333	0.80	8.400	1.59	14.467	1.84	20.53	0.73
2.367	0.80	8.433	1.59	14.500	1.84	20.57	0.73
2.400	0.80	8.467	1.59	14.533	1.84	20.60	0.73
2.433	0.80	8.500	1.59	14.567	1.84	20.63	0.73
2.467	0.80	8.533	1.59	14.600	1.84	20.67	0.73
2.500	0.80	8.567	1.59	14.633	1.84	20.70	0.73
2.533	0.80	8.600	1.59	14.667	1.84	20.73	0.73
2.567	0.80	8.633	1.59	14.700	1.84	20.77	0.73
2.600	0.80	8.667	1.59	14.733	1.84	20.80	0.73
2.633	0.80	8.700	1.59	14.767	1.84	20.83	0.73
2.667	0.80	8.733	1.59	14.800	1.84	20.87	0.73
2.700	0.80	8.767	1.65	14.833	1.84	20.90	0.73
2.733	0.80	8.800	1.71	14.867	1.84	20.93	0.73
2.767	0.80	8.833	1.71	14.900	1.84	20.97	0.73
2.800	0.80	8.867	1.71	14.933	1.84	21.00	0.73
2.833	0.80	8.900	1.71	14.967	1.84	21.03	0.73
2.867	0.80	8.933	1.71	15.000	1.84	21.07	0.73
2.900	0.80	8.967	1.71	15.033	1.84	21.10	0.73
2.933	0.80	9.000	1.71	15.067	1.84	21.13	0.73
2.967	0.80	9.033	1.71	15.100	1.84	21.17	0.73
3.000	0.80	9.067	1.71	15.133	1.84	21.20	0.73
3.033	0.80	9.100	1.71	15.167	1.84	21.23	0.73
3.067	0.80	9.133	1.71	15.200	1.84	21.27	0.73
3.100	0.80	9.167	1.71	15.233	1.84	21.30	0.73
3.133	0.80	9.200	1.71	15.267	1.84	21.33	0.73
3.167	0.80	9.233	1.71	15.300	1.84	21.37	0.73
3.200	0.80	9.267	1.84	15.333	1.84	21.40	0.73
3.233	0.80	9.300	1.96	15.367	1.84	21.43	0.73
3.267	0.80	9.333	1.96	15.400	1.84	21.47	0.73
3.300	0.80	9.367	1.96	15.433	1.84	21.50	0.73
3.333	0.80	9.400	1.96	15.467	1.84	21.53	0.73
3.367	0.80	9.433	1.96	15.500	1.84	21.57	0.73
3.400	0.80	9.467	1.96	15.533	1.84	21.60	0.73
3.433	0.80	9.500	1.96	15.567	1.84	21.63	0.73
3.467	0.80	9.533	1.96	15.600	1.84	21.67	0.73
3.500	0.80	9.567	1.96	15.633	1.84	21.70	0.73
3.533	0.80	9.600	1.96	15.667	1.84	21.73	0.73
3.567	0.80	9.633	1.96	15.700	1.84	21.77	0.73
3.600	0.80	9.667	1.96	15.733	1.84	21.80	0.73

3.633	0.80	9.700	1.96	15.767	1.84	21.83	0.73
3.667	0.80	9.733	1.96	15.800	1.84	21.87	0.73
3.700	0.80	9.767	2.08	15.833	1.84	21.90	0.73
3.733	0.80	9.800	2.20	15.867	1.84	21.93	0.73
3.767	0.80	9.833	2.20	15.900	1.84	21.97	0.73
3.800	0.80	9.867	2.20	15.933	1.84	22.00	0.73
3.833	0.80	9.900	2.20	15.967	1.84	22.03	0.73
3.867	0.80	9.933	2.20	16.000	1.84	22.07	0.73
3.900	0.80	9.967	2.20	16.033	1.84	22.10	0.73
3.933	0.80	10.000	2.20	16.067	1.84	22.13	0.73
3.967	0.80	10.033	2.20	16.100	1.84	22.17	0.73
4.000	0.80	10.067	2.20	16.133	1.84	22.20	0.73
4.033	0.80	10.100	2.20	16.167	1.84	22.23	0.73
4.067	0.80	10.133	2.20	16.200	1.84	22.27	0.73
4.100	0.80	10.167	2.20	16.233	1.84	22.30	0.73
4.133	0.80	10.200	2.20	16.267	1.47	22.33	0.73
4.167	0.80	10.233	2.20	16.300	1.10	22.37	0.73
4.200	0.80	10.267	2.51	16.333	1.10	22.40	0.73
4.233	0.80	10.300	2.82	16.367	1.10	22.43	0.73
4.267	0.89	10.333	2.82	16.400	1.10	22.47	0.73
4.300	0.98	10.367	2.82	16.433	1.10	22.50	0.73
4.333	0.98	10.400	2.82	16.467	1.10	22.53	0.73
4.367	0.98	10.433	2.82	16.500	1.10	22.57	0.73
4.400	0.98	10.467	2.82	16.533	1.10	22.60	0.73
4.433	0.98	10.500	2.82	16.567	1.10	22.63	0.73
4.467	0.98	10.533	2.82	16.600	1.10	22.67	0.73
4.500	0.98	10.567	2.82	16.633	1.10	22.70	0.73
4.533	0.98	10.600	2.82	16.667	1.10	22.73	0.73
4.567	0.98	10.633	2.82	16.700	1.10	22.77	0.73
4.600	0.98	10.667	2.82	16.733	1.10	22.80	0.73
4.633	0.98	10.700	2.82	16.767	1.10	22.83	0.73
4.667	0.98	10.733	2.82	16.800	1.10	22.87	0.73
4.700	0.98	10.767	3.31	16.833	1.10	22.90	0.73
4.733	0.98	10.800	3.80	16.867	1.10	22.93	0.73
4.767	0.98	10.833	3.80	16.900	1.10	22.97	0.73
4.800	0.98	10.867	3.80	16.933	1.10	23.00	0.73
4.833	0.98	10.900	3.80	16.967	1.10	23.03	0.73
4.867	0.98	10.933	3.80	17.000	1.10	23.07	0.73
4.900	0.98	10.967	3.80	17.033	1.10	23.10	0.73
4.933	0.98	11.000	3.80	17.067	1.10	23.13	0.73
4.967	0.98	11.033	3.80	17.100	1.10	23.17	0.73
5.000	0.98	11.067	3.80	17.133	1.10	23.20	0.73
5.033	0.98	11.100	3.80	17.167	1.10	23.23	0.73
5.067	0.98	11.133	3.80	17.200	1.10	23.27	0.73
5.100	0.98	11.167	3.80	17.233	1.10	23.30	0.73
5.133	0.98	11.200	3.80	17.267	1.10	23.33	0.73
5.167	0.98	11.233	3.80	17.300	1.10	23.37	0.73
5.200	0.98	11.267	4.84	17.333	1.10	23.40	0.73
5.233	0.98	11.300	5.88	17.367	1.10	23.43	0.73

5.267	0.98	11.333	5.88	17.400	1.10	23.47	0.73
5.300	0.98	11.367	5.88	17.433	1.10	23.50	0.73
5.333	0.98	11.400	5.88	17.467	1.10	23.53	0.73
5.367	0.98	11.433	5.88	17.500	1.10	23.57	0.73
5.400	0.98	11.467	5.88	17.533	1.10	23.60	0.73
5.433	0.98	11.500	5.88	17.567	1.10	23.63	0.73
5.467	0.98	11.533	5.88	17.600	1.10	23.67	0.73
5.500	0.98	11.567	5.88	17.633	1.10	23.70	0.73
5.533	0.98	11.600	5.88	17.667	1.10	23.73	0.73
5.567	0.98	11.633	5.88	17.700	1.10	23.77	0.73
5.600	0.98	11.667	5.88	17.733	1.10	23.80	0.73
5.633	0.98	11.700	5.88	17.767	1.10	23.83	0.73
5.667	0.98	11.733	5.88	17.800	1.10	23.87	0.73
5.700	0.98	11.767	12.02	17.833	1.10	23.90	0.73
5.733	0.98	11.800	18.13	17.867	1.10	23.93	0.73
5.767	0.98	11.833	18.13	17.900	1.10	23.97	0.73
5.800	0.98	11.867	18.13	17.933	1.10	24.00	0.73
5.833	0.98	11.900	18.13	17.967	1.10	24.03	0.73
5.867	0.98	11.933	18.13	18.000	1.10	24.07	0.73
5.900	0.98	11.967	18.13	18.033	1.10	24.10	0.73
5.933	0.98	12.000	18.21	18.067	1.10	24.13	0.73
5.967	0.98	12.033	74.96	18.100	1.10	24.17	0.73
6.000	0.98	12.067	74.96	18.133	1.10	24.20	0.73
6.033	0.98	12.100	74.96	18.167	1.10	24.23	0.73
6.067	0.98	12.133	74.96	18.200	1.10	24.27	0.37

Max.Eff.Inten.(mm/hr)=	74.96	18.51	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.79 (ii)	9.21 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.43	0.12	
			TOTALS
PEAK FLOW (cms)=	0.03	0.01	0.039 (iii)
TIME TO PEAK (hrs)=	12.23	12.33	12.23
RUNOFF VOLUME (mm)=	59.24	13.17	38.03
TOTAL RAINFALL (mm)=	61.24	61.24	61.24
RUNOFF COEFFICIENT =	0.97	0.22	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB

STANDHYD (0160)	Area (ha)= 0.34
ID= 1 DT= 2.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.10
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	47.61	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.98	12.167	74.96	18.23	1.10
0.067	0.00	6.133	0.98	12.200	74.96	18.27	1.10
0.100	0.00	6.167	0.98	12.233	74.96	18.30	1.10
0.133	0.00	6.200	0.98	12.267	41.79	18.33	1.10
0.167	0.00	6.233	0.98	12.300	8.82	18.37	1.10
0.200	0.00	6.267	1.04	12.333	8.82	18.40	1.10
0.233	0.00	6.300	1.10	12.367	8.82	18.43	1.10
0.267	0.34	6.333	1.10	12.400	8.82	18.47	1.10
0.300	0.67	6.367	1.10	12.433	8.82	18.50	1.10
0.333	0.67	6.400	1.10	12.467	8.82	18.53	1.10
0.367	0.67	6.433	1.10	12.500	8.82	18.57	1.10
0.400	0.67	6.467	1.10	12.533	8.82	18.60	1.10
0.433	0.67	6.500	1.10	12.567	8.82	18.63	1.10
0.467	0.67	6.533	1.10	12.600	8.82	18.67	1.10
0.500	0.67	6.567	1.10	12.633	8.82	18.70	1.10
0.533	0.67	6.600	1.10	12.667	8.82	18.73	1.10
0.567	0.67	6.633	1.10	12.700	8.82	18.77	1.10
0.600	0.67	6.667	1.10	12.733	8.82	18.80	1.10
0.633	0.67	6.700	1.10	12.767	6.67	18.83	1.10
0.667	0.67	6.733	1.10	12.800	4.53	18.87	1.10
0.700	0.67	6.767	1.10	12.833	4.53	18.90	1.10
0.733	0.67	6.800	1.10	12.867	4.53	18.93	1.10
0.767	0.67	6.833	1.10	12.900	4.53	18.97	1.10
0.800	0.67	6.867	1.10	12.933	4.53	19.00	1.10
0.833	0.67	6.900	1.10	12.967	4.53	19.03	1.10
0.867	0.67	6.933	1.10	13.000	4.53	19.07	1.10
0.900	0.67	6.967	1.10	13.033	4.53	19.10	1.10
0.933	0.67	7.000	1.10	13.067	4.53	19.13	1.10
0.967	0.67	7.033	1.10	13.100	4.53	19.17	1.10
1.000	0.67	7.067	1.10	13.133	4.53	19.20	1.10
1.033	0.67	7.100	1.10	13.167	4.53	19.23	1.10
1.067	0.67	7.133	1.10	13.200	4.53	19.27	1.10
1.100	0.67	7.167	1.10	13.233	4.53	19.30	1.10

1.133	0.67	7.200	1.10	13.267	3.92	19.33	1.10
1.167	0.67	7.233	1.10	13.300	3.31	19.37	1.10
1.200	0.67	7.267	1.22	13.333	3.31	19.40	1.10
1.233	0.67	7.300	1.35	13.367	3.31	19.43	1.10
1.267	0.67	7.333	1.35	13.400	3.31	19.47	1.10
1.300	0.67	7.367	1.35	13.433	3.31	19.50	1.10
1.333	0.67	7.400	1.35	13.467	3.31	19.53	1.10
1.367	0.67	7.433	1.35	13.500	3.31	19.57	1.10
1.400	0.67	7.467	1.35	13.533	3.31	19.60	1.10
1.433	0.67	7.500	1.35	13.567	3.31	19.63	1.10
1.467	0.67	7.533	1.35	13.600	3.31	19.67	1.10
1.500	0.67	7.567	1.35	13.633	3.31	19.70	1.10
1.533	0.67	7.600	1.35	13.667	3.31	19.73	1.10
1.567	0.67	7.633	1.35	13.700	3.31	19.77	1.10
1.600	0.67	7.667	1.35	13.733	3.31	19.80	1.10
1.633	0.67	7.700	1.35	13.767	2.94	19.83	1.10
1.667	0.67	7.733	1.35	13.800	2.57	19.87	1.10
1.700	0.67	7.767	1.35	13.833	2.57	19.90	1.10
1.733	0.67	7.800	1.35	13.867	2.57	19.93	1.10
1.767	0.67	7.833	1.35	13.900	2.57	19.97	1.10
1.800	0.67	7.867	1.35	13.933	2.57	20.00	1.10
1.833	0.67	7.900	1.35	13.967	2.57	20.03	1.10
1.867	0.67	7.933	1.35	14.000	2.57	20.07	1.10
1.900	0.67	7.967	1.35	14.033	2.57	20.10	1.10
1.933	0.67	8.000	1.35	14.067	2.57	20.13	1.10
1.967	0.67	8.033	1.35	14.100	2.57	20.17	1.10
2.000	0.67	8.067	1.35	14.133	2.57	20.20	1.10
2.033	0.67	8.100	1.35	14.167	2.57	20.23	1.10
2.067	0.67	8.133	1.35	14.200	2.57	20.27	0.92
2.100	0.67	8.167	1.35	14.233	2.57	20.30	0.73
2.133	0.67	8.200	1.35	14.267	2.20	20.33	0.73
2.167	0.67	8.233	1.35	14.300	1.84	20.37	0.73
2.200	0.67	8.267	1.47	14.333	1.84	20.40	0.73
2.233	0.67	8.300	1.59	14.367	1.84	20.43	0.73
2.267	0.73	8.333	1.59	14.400	1.84	20.47	0.73
2.300	0.80	8.367	1.59	14.433	1.84	20.50	0.73
2.333	0.80	8.400	1.59	14.467	1.84	20.53	0.73
2.367	0.80	8.433	1.59	14.500	1.84	20.57	0.73
2.400	0.80	8.467	1.59	14.533	1.84	20.60	0.73
2.433	0.80	8.500	1.59	14.567	1.84	20.63	0.73
2.467	0.80	8.533	1.59	14.600	1.84	20.67	0.73
2.500	0.80	8.567	1.59	14.633	1.84	20.70	0.73
2.533	0.80	8.600	1.59	14.667	1.84	20.73	0.73
2.567	0.80	8.633	1.59	14.700	1.84	20.77	0.73
2.600	0.80	8.667	1.59	14.733	1.84	20.80	0.73
2.633	0.80	8.700	1.59	14.767	1.84	20.83	0.73
2.667	0.80	8.733	1.59	14.800	1.84	20.87	0.73
2.700	0.80	8.767	1.65	14.833	1.84	20.90	0.73
2.733	0.80	8.800	1.71	14.867	1.84	20.93	0.73

2.767	0.80	8.833	1.71	14.900	1.84	20.97	0.73
2.800	0.80	8.867	1.71	14.933	1.84	21.00	0.73
2.833	0.80	8.900	1.71	14.967	1.84	21.03	0.73
2.867	0.80	8.933	1.71	15.000	1.84	21.07	0.73
2.900	0.80	8.967	1.71	15.033	1.84	21.10	0.73
2.933	0.80	9.000	1.71	15.067	1.84	21.13	0.73
2.967	0.80	9.033	1.71	15.100	1.84	21.17	0.73
3.000	0.80	9.067	1.71	15.133	1.84	21.20	0.73
3.033	0.80	9.100	1.71	15.167	1.84	21.23	0.73
3.067	0.80	9.133	1.71	15.200	1.84	21.27	0.73
3.100	0.80	9.167	1.71	15.233	1.84	21.30	0.73
3.133	0.80	9.200	1.71	15.267	1.84	21.33	0.73
3.167	0.80	9.233	1.71	15.300	1.84	21.37	0.73
3.200	0.80	9.267	1.84	15.333	1.84	21.40	0.73
3.233	0.80	9.300	1.96	15.367	1.84	21.43	0.73
3.267	0.80	9.333	1.96	15.400	1.84	21.47	0.73
3.300	0.80	9.367	1.96	15.433	1.84	21.50	0.73
3.333	0.80	9.400	1.96	15.467	1.84	21.53	0.73
3.367	0.80	9.433	1.96	15.500	1.84	21.57	0.73
3.400	0.80	9.467	1.96	15.533	1.84	21.60	0.73
3.433	0.80	9.500	1.96	15.567	1.84	21.63	0.73
3.467	0.80	9.533	1.96	15.600	1.84	21.67	0.73
3.500	0.80	9.567	1.96	15.633	1.84	21.70	0.73
3.533	0.80	9.600	1.96	15.667	1.84	21.73	0.73
3.567	0.80	9.633	1.96	15.700	1.84	21.77	0.73
3.600	0.80	9.667	1.96	15.733	1.84	21.80	0.73
3.633	0.80	9.700	1.96	15.767	1.84	21.83	0.73
3.667	0.80	9.733	1.96	15.800	1.84	21.87	0.73
3.700	0.80	9.767	2.08	15.833	1.84	21.90	0.73
3.733	0.80	9.800	2.20	15.867	1.84	21.93	0.73
3.767	0.80	9.833	2.20	15.900	1.84	21.97	0.73
3.800	0.80	9.867	2.20	15.933	1.84	22.00	0.73
3.833	0.80	9.900	2.20	15.967	1.84	22.03	0.73
3.867	0.80	9.933	2.20	16.000	1.84	22.07	0.73
3.900	0.80	9.967	2.20	16.033	1.84	22.10	0.73
3.933	0.80	10.000	2.20	16.067	1.84	22.13	0.73
3.967	0.80	10.033	2.20	16.100	1.84	22.17	0.73
4.000	0.80	10.067	2.20	16.133	1.84	22.20	0.73
4.033	0.80	10.100	2.20	16.167	1.84	22.23	0.73
4.067	0.80	10.133	2.20	16.200	1.84	22.27	0.73
4.100	0.80	10.167	2.20	16.233	1.84	22.30	0.73
4.133	0.80	10.200	2.20	16.267	1.47	22.33	0.73
4.167	0.80	10.233	2.20	16.300	1.10	22.37	0.73
4.200	0.80	10.267	2.51	16.333	1.10	22.40	0.73
4.233	0.80	10.300	2.82	16.367	1.10	22.43	0.73
4.267	0.89	10.333	2.82	16.400	1.10	22.47	0.73
4.300	0.98	10.367	2.82	16.433	1.10	22.50	0.73
4.333	0.98	10.400	2.82	16.467	1.10	22.53	0.73
4.367	0.98	10.433	2.82	16.500	1.10	22.57	0.73

4.400	0.98	10.467	2.82	16.533	1.10	22.60	0.73
4.433	0.98	10.500	2.82	16.567	1.10	22.63	0.73
4.467	0.98	10.533	2.82	16.600	1.10	22.67	0.73
4.500	0.98	10.567	2.82	16.633	1.10	22.70	0.73
4.533	0.98	10.600	2.82	16.667	1.10	22.73	0.73
4.567	0.98	10.633	2.82	16.700	1.10	22.77	0.73
4.600	0.98	10.667	2.82	16.733	1.10	22.80	0.73
4.633	0.98	10.700	2.82	16.767	1.10	22.83	0.73
4.667	0.98	10.733	2.82	16.800	1.10	22.87	0.73
4.700	0.98	10.767	3.31	16.833	1.10	22.90	0.73
4.733	0.98	10.800	3.80	16.867	1.10	22.93	0.73
4.767	0.98	10.833	3.80	16.900	1.10	22.97	0.73
4.800	0.98	10.867	3.80	16.933	1.10	23.00	0.73
4.833	0.98	10.900	3.80	16.967	1.10	23.03	0.73
4.867	0.98	10.933	3.80	17.000	1.10	23.07	0.73
4.900	0.98	10.967	3.80	17.033	1.10	23.10	0.73
4.933	0.98	11.000	3.80	17.067	1.10	23.13	0.73
4.967	0.98	11.033	3.80	17.100	1.10	23.17	0.73
5.000	0.98	11.067	3.80	17.133	1.10	23.20	0.73
5.033	0.98	11.100	3.80	17.167	1.10	23.23	0.73
5.067	0.98	11.133	3.80	17.200	1.10	23.27	0.73
5.100	0.98	11.167	3.80	17.233	1.10	23.30	0.73
5.133	0.98	11.200	3.80	17.267	1.10	23.33	0.73
5.167	0.98	11.233	3.80	17.300	1.10	23.37	0.73
5.200	0.98	11.267	4.84	17.333	1.10	23.40	0.73
5.233	0.98	11.300	5.88	17.367	1.10	23.43	0.73
5.267	0.98	11.333	5.88	17.400	1.10	23.47	0.73
5.300	0.98	11.367	5.88	17.433	1.10	23.50	0.73
5.333	0.98	11.400	5.88	17.467	1.10	23.53	0.73
5.367	0.98	11.433	5.88	17.500	1.10	23.57	0.73
5.400	0.98	11.467	5.88	17.533	1.10	23.60	0.73
5.433	0.98	11.500	5.88	17.567	1.10	23.63	0.73
5.467	0.98	11.533	5.88	17.600	1.10	23.67	0.73
5.500	0.98	11.567	5.88	17.633	1.10	23.70	0.73
5.533	0.98	11.600	5.88	17.667	1.10	23.73	0.73
5.567	0.98	11.633	5.88	17.700	1.10	23.77	0.73
5.600	0.98	11.667	5.88	17.733	1.10	23.80	0.73
5.633	0.98	11.700	5.88	17.767	1.10	23.83	0.73
5.667	0.98	11.733	5.88	17.800	1.10	23.87	0.73
5.700	0.98	11.767	12.02	17.833	1.10	23.90	0.73
5.733	0.98	11.800	18.13	17.867	1.10	23.93	0.73
5.767	0.98	11.833	18.13	17.900	1.10	23.97	0.73
5.800	0.98	11.867	18.13	17.933	1.10	24.00	0.73
5.833	0.98	11.900	18.13	17.967	1.10	24.03	0.73
5.867	0.98	11.933	18.13	18.000	1.10	24.07	0.73
5.900	0.98	11.967	18.13	18.033	1.10	24.10	0.73
5.933	0.98	12.000	18.21	18.067	1.10	24.13	0.73
5.967	0.98	12.033	74.96	18.100	1.10	24.17	0.73
6.000	0.98	12.067	74.96	18.133	1.10	24.20	0.73

6.033	0.98	12.100	74.96	18.167	1.10	24.23	0.73
6.067	0.98	12.133	74.96	18.200	1.10	24.27	0.37

Max.Eff.Inten.(mm/hr)=	74.96	18.51	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.84 (ii)	7.27 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.42	0.15	
			TOTALS
PEAK FLOW (cms)=	0.05	0.00	0.054 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	59.24	13.17	46.33
TOTAL RAINFALL (mm)=	61.24	61.24	61.24
RUNOFF COEFFICIENT =	0.97	0.22	0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	0.31	0.039	12.23	38.03
+ ID2= 2 (0160):	0.34	0.054	12.23	46.33
ID = 3 (0162):	0.65	0.094	12.23	42.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.085	12.23	36.14
+ ID2= 2 (0162):	0.65	0.094	12.23	42.37
ID = 3 (0167):	1.47	0.178	12.23	38.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0140)	Area (ha)= 0.11
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	27.08	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	0.98	12.167	74.96	18.23	1.10
0.067	0.00	6.133	0.98	12.200	74.96	18.27	1.10
0.100	0.00	6.167	0.98	12.233	74.96	18.30	1.10
0.133	0.00	6.200	0.98	12.267	41.79	18.33	1.10
0.167	0.00	6.233	0.98	12.300	8.82	18.37	1.10
0.200	0.00	6.267	1.04	12.333	8.82	18.40	1.10
0.233	0.00	6.300	1.10	12.367	8.82	18.43	1.10
0.267	0.34	6.333	1.10	12.400	8.82	18.47	1.10
0.300	0.67	6.367	1.10	12.433	8.82	18.50	1.10
0.333	0.67	6.400	1.10	12.467	8.82	18.53	1.10
0.367	0.67	6.433	1.10	12.500	8.82	18.57	1.10
0.400	0.67	6.467	1.10	12.533	8.82	18.60	1.10
0.433	0.67	6.500	1.10	12.567	8.82	18.63	1.10
0.467	0.67	6.533	1.10	12.600	8.82	18.67	1.10
0.500	0.67	6.567	1.10	12.633	8.82	18.70	1.10
0.533	0.67	6.600	1.10	12.667	8.82	18.73	1.10
0.567	0.67	6.633	1.10	12.700	8.82	18.77	1.10
0.600	0.67	6.667	1.10	12.733	8.82	18.80	1.10
0.633	0.67	6.700	1.10	12.767	6.67	18.83	1.10
0.667	0.67	6.733	1.10	12.800	4.53	18.87	1.10
0.700	0.67	6.767	1.10	12.833	4.53	18.90	1.10
0.733	0.67	6.800	1.10	12.867	4.53	18.93	1.10
0.767	0.67	6.833	1.10	12.900	4.53	18.97	1.10
0.800	0.67	6.867	1.10	12.933	4.53	19.00	1.10
0.833	0.67	6.900	1.10	12.967	4.53	19.03	1.10
0.867	0.67	6.933	1.10	13.000	4.53	19.07	1.10
0.900	0.67	6.967	1.10	13.033	4.53	19.10	1.10
0.933	0.67	7.000	1.10	13.067	4.53	19.13	1.10
0.967	0.67	7.033	1.10	13.100	4.53	19.17	1.10
1.000	0.67	7.067	1.10	13.133	4.53	19.20	1.10
1.033	0.67	7.100	1.10	13.167	4.53	19.23	1.10
1.067	0.67	7.133	1.10	13.200	4.53	19.27	1.10

1.100	0.67	7.167	1.10	13.233	4.53	19.30	1.10
1.133	0.67	7.200	1.10	13.267	3.92	19.33	1.10
1.167	0.67	7.233	1.10	13.300	3.31	19.37	1.10
1.200	0.67	7.267	1.22	13.333	3.31	19.40	1.10
1.233	0.67	7.300	1.35	13.367	3.31	19.43	1.10
1.267	0.67	7.333	1.35	13.400	3.31	19.47	1.10
1.300	0.67	7.367	1.35	13.433	3.31	19.50	1.10
1.333	0.67	7.400	1.35	13.467	3.31	19.53	1.10
1.367	0.67	7.433	1.35	13.500	3.31	19.57	1.10
1.400	0.67	7.467	1.35	13.533	3.31	19.60	1.10
1.433	0.67	7.500	1.35	13.567	3.31	19.63	1.10
1.467	0.67	7.533	1.35	13.600	3.31	19.67	1.10
1.500	0.67	7.567	1.35	13.633	3.31	19.70	1.10
1.533	0.67	7.600	1.35	13.667	3.31	19.73	1.10
1.567	0.67	7.633	1.35	13.700	3.31	19.77	1.10
1.600	0.67	7.667	1.35	13.733	3.31	19.80	1.10
1.633	0.67	7.700	1.35	13.767	2.94	19.83	1.10
1.667	0.67	7.733	1.35	13.800	2.57	19.87	1.10
1.700	0.67	7.767	1.35	13.833	2.57	19.90	1.10
1.733	0.67	7.800	1.35	13.867	2.57	19.93	1.10
1.767	0.67	7.833	1.35	13.900	2.57	19.97	1.10
1.800	0.67	7.867	1.35	13.933	2.57	20.00	1.10
1.833	0.67	7.900	1.35	13.967	2.57	20.03	1.10
1.867	0.67	7.933	1.35	14.000	2.57	20.07	1.10
1.900	0.67	7.967	1.35	14.033	2.57	20.10	1.10
1.933	0.67	8.000	1.35	14.067	2.57	20.13	1.10
1.967	0.67	8.033	1.35	14.100	2.57	20.17	1.10
2.000	0.67	8.067	1.35	14.133	2.57	20.20	1.10
2.033	0.67	8.100	1.35	14.167	2.57	20.23	1.10
2.067	0.67	8.133	1.35	14.200	2.57	20.27	0.92
2.100	0.67	8.167	1.35	14.233	2.57	20.30	0.73
2.133	0.67	8.200	1.35	14.267	2.20	20.33	0.73
2.167	0.67	8.233	1.35	14.300	1.84	20.37	0.73
2.200	0.67	8.267	1.47	14.333	1.84	20.40	0.73
2.233	0.67	8.300	1.59	14.367	1.84	20.43	0.73
2.267	0.73	8.333	1.59	14.400	1.84	20.47	0.73
2.300	0.80	8.367	1.59	14.433	1.84	20.50	0.73
2.333	0.80	8.400	1.59	14.467	1.84	20.53	0.73
2.367	0.80	8.433	1.59	14.500	1.84	20.57	0.73
2.400	0.80	8.467	1.59	14.533	1.84	20.60	0.73
2.433	0.80	8.500	1.59	14.567	1.84	20.63	0.73
2.467	0.80	8.533	1.59	14.600	1.84	20.67	0.73
2.500	0.80	8.567	1.59	14.633	1.84	20.70	0.73
2.533	0.80	8.600	1.59	14.667	1.84	20.73	0.73
2.567	0.80	8.633	1.59	14.700	1.84	20.77	0.73
2.600	0.80	8.667	1.59	14.733	1.84	20.80	0.73
2.633	0.80	8.700	1.59	14.767	1.84	20.83	0.73
2.667	0.80	8.733	1.59	14.800	1.84	20.87	0.73
2.700	0.80	8.767	1.65	14.833	1.84	20.90	0.73

SCS 24 hr_Exsting Conditions

2.733	0.80	8.800	1.71	14.867	1.84	20.93	0.73
2.767	0.80	8.833	1.71	14.900	1.84	20.97	0.73
2.800	0.80	8.867	1.71	14.933	1.84	21.00	0.73
2.833	0.80	8.900	1.71	14.967	1.84	21.03	0.73
2.867	0.80	8.933	1.71	15.000	1.84	21.07	0.73
2.900	0.80	8.967	1.71	15.033	1.84	21.10	0.73
2.933	0.80	9.000	1.71	15.067	1.84	21.13	0.73
2.967	0.80	9.033	1.71	15.100	1.84	21.17	0.73
3.000	0.80	9.067	1.71	15.133	1.84	21.20	0.73
3.033	0.80	9.100	1.71	15.167	1.84	21.23	0.73
3.067	0.80	9.133	1.71	15.200	1.84	21.27	0.73
3.100	0.80	9.167	1.71	15.233	1.84	21.30	0.73
3.133	0.80	9.200	1.71	15.267	1.84	21.33	0.73
3.167	0.80	9.233	1.71	15.300	1.84	21.37	0.73
3.200	0.80	9.267	1.84	15.333	1.84	21.40	0.73
3.233	0.80	9.300	1.96	15.367	1.84	21.43	0.73
3.267	0.80	9.333	1.96	15.400	1.84	21.47	0.73
3.300	0.80	9.367	1.96	15.433	1.84	21.50	0.73
3.333	0.80	9.400	1.96	15.467	1.84	21.53	0.73
3.367	0.80	9.433	1.96	15.500	1.84	21.57	0.73
3.400	0.80	9.467	1.96	15.533	1.84	21.60	0.73
3.433	0.80	9.500	1.96	15.567	1.84	21.63	0.73
3.467	0.80	9.533	1.96	15.600	1.84	21.67	0.73
3.500	0.80	9.567	1.96	15.633	1.84	21.70	0.73
3.533	0.80	9.600	1.96	15.667	1.84	21.73	0.73
3.567	0.80	9.633	1.96	15.700	1.84	21.77	0.73
3.600	0.80	9.667	1.96	15.733	1.84	21.80	0.73
3.633	0.80	9.700	1.96	15.767	1.84	21.83	0.73
3.667	0.80	9.733	1.96	15.800	1.84	21.87	0.73
3.700	0.80	9.767	2.08	15.833	1.84	21.90	0.73
3.733	0.80	9.800	2.20	15.867	1.84	21.93	0.73
3.767	0.80	9.833	2.20	15.900	1.84	21.97	0.73
3.800	0.80	9.867	2.20	15.933	1.84	22.00	0.73
3.833	0.80	9.900	2.20	15.967	1.84	22.03	0.73
3.867	0.80	9.933	2.20	16.000	1.84	22.07	0.73
3.900	0.80	9.967	2.20	16.033	1.84	22.10	0.73
3.933	0.80	10.000	2.20	16.067	1.84	22.13	0.73
3.967	0.80	10.033	2.20	16.100	1.84	22.17	0.73
4.000	0.80	10.067	2.20	16.133	1.84	22.20	0.73
4.033	0.80	10.100	2.20	16.167	1.84	22.23	0.73
4.067	0.80	10.133	2.20	16.200	1.84	22.27	0.73
4.100	0.80	10.167	2.20	16.233	1.84	22.30	0.73
4.133	0.80	10.200	2.20	16.267	1.47	22.33	0.73
4.167	0.80	10.233	2.20	16.300	1.10	22.37	0.73
4.200	0.80	10.267	2.51	16.333	1.10	22.40	0.73
4.233	0.80	10.300	2.82	16.367	1.10	22.43	0.73
4.267	0.89	10.333	2.82	16.400	1.10	22.47	0.73
4.300	0.98	10.367	2.82	16.433	1.10	22.50	0.73
4.333	0.98	10.400	2.82	16.467	1.10	22.53	0.73

SCS 24 hr_Exsting Conditions

4.367	0.98	10.433	2.82	16.500	1.10	22.57	0.73
4.400	0.98	10.467	2.82	16.533	1.10	22.60	0.73
4.433	0.98	10.500	2.82	16.567	1.10	22.63	0.73
4.467	0.98	10.533	2.82	16.600	1.10	22.67	0.73
4.500	0.98	10.567	2.82	16.633	1.10	22.70	0.73
4.533	0.98	10.600	2.82	16.667	1.10	22.73	0.73
4.567	0.98	10.633	2.82	16.700	1.10	22.77	0.73
4.600	0.98	10.667	2.82	16.733	1.10	22.80	0.73
4.633	0.98	10.700	2.82	16.767	1.10	22.83	0.73
4.667	0.98	10.733	2.82	16.800	1.10	22.87	0.73
4.700	0.98	10.767	3.31	16.833	1.10	22.90	0.73
4.733	0.98	10.800	3.80	16.867	1.10	22.93	0.73
4.767	0.98	10.833	3.80	16.900	1.10	22.97	0.73
4.800	0.98	10.867	3.80	16.933	1.10	23.00	0.73
4.833	0.98	10.900	3.80	16.967	1.10	23.03	0.73
4.867	0.98	10.933	3.80	17.000	1.10	23.07	0.73
4.900	0.98	10.967	3.80	17.033	1.10	23.10	0.73
4.933	0.98	11.000	3.80	17.067	1.10	23.13	0.73
4.967	0.98	11.033	3.80	17.100	1.10	23.17	0.73
5.000	0.98	11.067	3.80	17.133	1.10	23.20	0.73
5.033	0.98	11.100	3.80	17.167	1.10	23.23	0.73
5.067	0.98	11.133	3.80	17.200	1.10	23.27	0.73
5.100	0.98	11.167	3.80	17.233	1.10	23.30	0.73
5.133	0.98	11.200	3.80	17.267	1.10	23.33	0.73
5.167	0.98	11.233	3.80	17.300	1.10	23.37	0.73
5.200	0.98	11.267	4.84	17.333	1.10	23.40	0.73
5.233	0.98	11.300	5.88	17.367	1.10	23.43	0.73
5.267	0.98	11.333	5.88	17.400	1.10	23.47	0.73
5.300	0.98	11.367	5.88	17.433	1.10	23.50	0.73
5.333	0.98	11.400	5.88	17.467	1.10	23.53	0.73
5.367	0.98	11.433	5.88	17.500	1.10	23.57	0.73
5.400	0.98	11.467	5.88	17.533	1.10	23.60	0.73
5.433	0.98	11.500	5.88	17.567	1.10	23.63	0.73
5.467	0.98	11.533	5.88	17.600	1.10	23.67	0.73
5.500	0.98	11.567	5.88	17.633	1.10	23.70	0.73
5.533	0.98	11.600	5.88	17.667	1.10	23.73	0.73
5.567	0.98	11.633	5.88	17.700	1.10	23.77	0.73
5.600	0.98	11.667	5.88	17.733	1.10	23.80	0.73
5.633	0.98	11.700	5.88	17.767	1.10	23.83	0.73
5.667	0.98	11.733	5.88	17.800	1.10	23.87	0.73
5.700	0.98	11.767	12.02	17.833	1.10	23.90	0.73
5.733	0.98	11.800	18.13	17.867	1.10	23.93	0.73
5.767	0.98	11.833	18.13	17.900	1.10	23.97	0.73
5.800	0.98	11.867	18.13	17.933	1.10	24.00	0.73
5.833	0.98	11.900	18.13	17.967	1.10	24.03	0.73
5.867	0.98	11.933	18.13	18.000	1.10	24.07	0.73
5.900	0.98	11.967	18.13	18.033	1.10	24.10	0.73
5.933	0.98	12.000	18.21	18.067	1.10	24.13	0.73
5.967	0.98	12.033	74.96	18.100	1.10	24.17	0.73

SCS 24 hr_Exsting Conditions

6.000	0.98	12.067	74.96	18.133	1.10	24.20	0.73
6.033	0.98	12.100	74.96	18.167	1.10	24.23	0.73
6.067	0.98	12.133	74.96	18.200	1.10	24.27	0.37

Max.Eff.Inten.(mm/hr)=	74.96	18.51	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.31 (ii)	6.30 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.48	0.16	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.018 (iii)
TIME TO PEAK (hrs)=	12.23	12.30	12.23
RUNOFF VOLUME (mm)=	59.24	13.17	48.16
TOTAL RAINFALL (mm)=	61.24	61.24	61.24
RUNOFF COEFFICIENT =	0.97	0.22	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Hydrologic Modelling output

Proposed Condition

Chicago 4 Hr Storm Distribution_Proposed Condition

Chicago 4 hr_Proposed Conditions

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================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\08
3a5f71-e5ec-42fd-8244-5f160c65706f\sc
  Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\08
3a5f71-e5ec-42fd-8244-5f160c65706f\sc


DATE: 01-16-2026                          TIME: 04:27:35

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 4hr  Chicago 100yr            **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=2518.000
| Ptotal= 76.41 mm |                          B=  13.200
```

Chicago 4 hr_Proposed Conditions

```
--------------------                      C=   0.882
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  4.00 hrs
                          Storm time step    = 10.00 min
                          Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.74	1.00	48.41	2.00	11.70	3.00	4.70
0.17	4.47	1.17	157.29	2.17	9.45	3.17	4.26
0.33	5.56	1.33	64.01	2.33	7.90	3.33	3.90
0.50	7.32	1.50	32.88	2.50	6.77	3.50	3.59
0.67	10.56	1.67	21.09	2.67	5.91	3.67	3.33
0.83	18.10	1.83	15.17	2.83	5.24	3.83	3.10

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0150)|   Area    (ha)=   0.38
|ID= 1 DT= 2.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.30         0.08
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      50.33        40.00
     Mannings n             =    0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90

Chicago 4 hr_Proposed Conditions

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

```
     Max.Eff.Inten.(mm/hr)=     157.29        34.28
                 over (min)        5.00         6.00
     Storage Coeff.  (min)=       1.41 (ii)    4.79 (ii)
     Unit Hyd. Tpeak (min)=       4.00         6.00
     Unit Hyd. peak  (cms)=       0.47         0.22
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.13         0.01          0.138 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.40           1.33
     RUNOFF VOLUME    (mm)=      74.41        19.97          63.51
     TOTAL RAINFALL   (mm)=      76.41        76.41          76.41
     RUNOFF COEFFICIENT   =       0.97         0.26           0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0130)|   Area    (ha)=   0.13
|ID= 1 DT= 2.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.00
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      29.44        40.00
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Chicago 4 hr_Proposed Conditions

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     Mannings n             =    0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

```
     Max.Eff.Inten.(mm/hr)=     157.29        53.22
                 over (min)        5.00         2.00
     Storage Coeff.  (min)=       1.02 (ii)    1.96 (ii)
     Unit Hyd. Tpeak (min)=       4.00         2.00
     Unit Hyd. peak  (cms)=       0.51         0.54
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.00          0.056 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      74.41        29.11          73.95
     TOTAL RAINFALL   (mm)=      76.41        76.41          76.41
```

RUNOFF COEFFICIENT = 0.97 0.38 0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0153)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0130):		0.13	0.056	1.33	73.95
+ ID2= 2 (0150):		0.38	0.138	1.33	63.51
ID = 3 (0153):		0.51	0.195	1.33	66.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)= 0.28		
ID= 1 DT= 2.0 min	Total Imp(%)= 68.00	Dir. Conn.(%)= 68.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.19	0.09
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	43.20	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Chicago 4 hr_Proposed Conditions

Max.Eff.Inten.(mm/hr)=	157.29	34.28	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.29 (ii)	5.64 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.48	0.20	
			TOTALS
PEAK FLOW (cms)=	0.08	0.01	0.089 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	74.41	19.97	56.98
TOTAL RAINFALL (mm)=	76.41	76.41	76.41
RUNOFF COEFFICIENT =	0.97	0.26	0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Chicago 4 hr_Proposed Conditions

ID1= 1 (0153):		0.51	0.195	1.33	66.17
+ ID2= 2 (0160):		0.28	0.089	1.33	56.98
ID = 3 (0162):		0.79	0.284	1.33	62.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0112)	Area (ha)= 0.32		
ID= 1 DT= 2.0 min	Total Imp(%)= 58.00	Dir. Conn.(%)= 58.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.19	0.13
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	46.19	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Chicago 4 hr_Proposed Conditions

Max.Eff.Inten.(mm/hr)=	157.29	53.22	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.34 (ii)	6.52 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.16	
			TOTALS
PEAK FLOW (cms)=	0.08	0.02	0.093 (iii)
TIME TO PEAK (hrs)=	1.33	1.43	1.33
RUNOFF VOLUME (mm)=	74.41	29.11	55.37
TOTAL RAINFALL (mm)=	76.41	76.41	76.41
RUNOFF COEFFICIENT =	0.97	0.38	0.72

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0120)	Area (ha)= 0.17		
ID= 1 DT= 2.0 min	Total Imp(%)= 95.00	Dir. Conn.(%)= 95.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.16	0.01
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	33.67	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70

0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Max.Eff.Inten.(mm/hr)=	157.29	53.22		
over (min)	5.00	4.00		
Storage Coeff. (min)=	1.11 (ii)	2.92 (ii)		
Unit Hyd. Tpeak (min)=	4.00	4.00		
Unit Hyd. peak (cms)=	0.50	0.34		
			TOTALS	
PEAK FLOW (cms)=	0.07	0.00	0.072 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	74.41	29.11	72.14	
TOTAL RAINFALL (mm)=	76.41	76.41	76.41	
RUNOFF COEFFICIENT =	0.97	0.38	0.94	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0121)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0112):	0.32	0.093	1.33	55.37
+ ID2= 2 (0120):	0.17	0.072	1.33	72.14
ID = 3 (0121):	0.49	0.165	1.33	61.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0115)
ID= 1 DT= 2.0 min

Area (ha)= 0.33
Total Imp(%)= 30.00 Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.23
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.90	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59

0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33
0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Max.Eff.Inten.(mm/hr)=	157.29	53.22		
over (min)	5.00	12.00		
Storage Coeff. (min)=	1.35 (ii)	10.44 (ii)		
Unit Hyd. Tpeak (min)=	4.00	12.00		
Unit Hyd. peak (cms)=	0.47	0.10		
			TOTALS	
PEAK FLOW (cms)=	0.04	0.02	0.054 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.33	
RUNOFF VOLUME (mm)=	74.41	29.11	42.68	
TOTAL RAINFALL (mm)=	76.41	76.41	76.41	
RUNOFF COEFFICIENT =	0.97	0.38	0.56	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0115):	0.33	0.054	1.33	42.68
+ ID2= 2 (0121):	0.49	0.165	1.33	61.19
ID = 3 (0122):	0.82	0.219	1.33	53.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.219	1.33	53.74
+ ID2= 2 (0162):	0.79	0.284	1.33	62.91
ID = 3 (0167):	1.61	0.504	1.33	58.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0140)
ID= 1 DT= 2.0 min

Area (ha)= 0.09
Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.02
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	24.49	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.74	1.033	48.41	2.033	11.70	3.03	4.70
0.067	3.74	1.067	48.41	2.067	11.70	3.07	4.70
0.100	3.74	1.100	48.41	2.100	11.70	3.10	4.70
0.133	3.74	1.133	48.41	2.133	11.70	3.13	4.70
0.167	3.74	1.167	48.41	2.167	11.70	3.17	4.70
0.200	4.47	1.200	157.29	2.200	9.45	3.20	4.26
0.233	4.47	1.233	157.29	2.233	9.45	3.23	4.26
0.267	4.47	1.267	157.29	2.267	9.45	3.27	4.26
0.300	4.47	1.300	157.29	2.300	9.45	3.30	4.26
0.333	4.47	1.333	157.29	2.333	9.45	3.33	4.26
0.367	5.56	1.367	64.01	2.367	7.90	3.37	3.90
0.400	5.56	1.400	64.01	2.400	7.90	3.40	3.90
0.433	5.56	1.433	64.01	2.433	7.90	3.43	3.90
0.467	5.56	1.467	64.01	2.467	7.90	3.47	3.90
0.500	5.56	1.500	64.01	2.500	7.90	3.50	3.90
0.533	7.32	1.533	32.88	2.533	6.77	3.53	3.59
0.567	7.32	1.567	32.88	2.567	6.77	3.57	3.59
0.600	7.32	1.600	32.88	2.600	6.77	3.60	3.59
0.633	7.32	1.633	32.88	2.633	6.77	3.63	3.59
0.667	7.32	1.667	32.88	2.667	6.77	3.67	3.59
0.700	10.56	1.700	21.09	2.700	5.91	3.70	3.33
0.733	10.56	1.733	21.09	2.733	5.91	3.73	3.33
0.767	10.56	1.767	21.09	2.767	5.91	3.77	3.33

0.800	10.56	1.800	21.09	2.800	5.91	3.80	3.33
0.833	10.56	1.833	21.09	2.833	5.91	3.83	3.33
0.867	18.10	1.867	15.17	2.867	5.24	3.87	3.10
0.900	18.10	1.900	15.17	2.900	5.24	3.90	3.10
0.933	18.10	1.933	15.17	2.933	5.24	3.93	3.10
0.967	18.10	1.967	15.17	2.967	5.24	3.97	3.10
1.000	18.10	2.000	15.17	3.000	5.24	4.00	3.10

Max.Eff.Inten.(mm/hr)=	157.29	34.28	
over (min)	5.00	6.00	
Storage Coeff. (min)=	0.92 (ii)	4.63 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.52	0.22	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.032 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	74.41	19.97	61.32
TOTAL RAINFALL (mm)=	76.41	76.41	76.41
RUNOFF COEFFICIENT =	0.97	0.26	0.80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

V V I SSSSS U U A L (v 6.2.2020)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\648b8295-5c55-4e8e-8f00-5b9492bac5e2\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\648b8295-5c55-4e8e-8f00-5b9492bac5e2\sc

DATE: 01-16-2026 TIME: 04:27:35

USER:

COMMENTS: _____

** SIMULATION : 4hr Chicago 2yr **

CHICAGO STORM	IDF curve parameters: A= 858.000
Ptotal= 37.06 mm	B= 6.800
	C= 0.822

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.15	1.00	20.33	2.00	5.50	3.00	2.59
0.17	2.49	1.17	84.39	2.17	4.60	3.17	2.39
0.33	2.98	1.33	26.99	2.33	3.97	3.33	2.23
0.50	3.73	1.50	13.71	2.50	3.49	3.50	2.08
0.67	5.04	1.67	9.12	2.67	3.13	3.67	1.95
0.83	7.98	1.83	6.85	2.83	2.83	3.83	1.84

CALIB

STANDHYD (0150)	Area (ha)= 0.38
ID= 1 DT= 2.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 80.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.30	0.08
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	50.33	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=	84.39	8.16	
over (min)	5.00	8.00	

Storage Coeff. (min)=	1.81 (ii)	6.15 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.43	0.17	
			TOTALS
PEAK FLOW (cms)=	0.07	0.00	0.072 (iii)
TIME TO PEAK (hrs)=	1.33	1.43	1.33
RUNOFF VOLUME (mm)=	35.06	4.76	28.99
TOTAL RAINFALL (mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT =	0.95	0.13	0.78

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0130)	Area (ha)= 0.13
ID= 1 DT= 2.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.13	0.00
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	29.44	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23

0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=	84.39	13.49	
over (min)	5.00	4.00	
Storage Coeff. (min)=	1.31 (ii)	2.51 (ii)	
Unit Hyd. Tpeak (min)=	4.00	4.00	
Unit Hyd. peak (cms)=	0.48	0.37	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.030 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	35.06	7.57	34.78
TOTAL RAINFALL (mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT =	0.95	0.20	0.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0153)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0130):	0.13	0.030	1.33	34.78
+ ID2= 2 (0150):	0.38	0.072	1.33	28.99
ID = 3 (0153):	0.51	0.102	1.33	30.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)= 0.28		
ID= 1 DT= 2.0 min	Total Imp(%)= 68.00	Dir. Conn.(%)= 68.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.09
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	43.20	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84

0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=	84.39	8.16	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.65 (ii)	7.24 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.44	0.15	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.045 (iii)
TIME TO PEAK (hrs)=	1.33	1.43	1.33
RUNOFF VOLUME (mm)=	35.06	4.76	25.35
TOTAL RAINFALL (mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT =	0.95	0.13	0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0153):	0.51	0.102	1.33	30.47
+ ID2= 2 (0160):	0.28	0.045	1.33	25.35
ID = 3 (0162):	0.79	0.147	1.33	28.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0112)	Area (ha)= 0.32		
ID= 1 DT= 2.0 min	Total Imp(%)= 58.00	Dir. Conn.(%)= 58.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.13
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.19	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=	84.39	13.49	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.72 (ii)	8.36 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.43	0.13	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.045 (iii)
TIME TO PEAK (hrs)=	1.33	1.47	1.33
RUNOFF VOLUME (mm)=	35.06	7.57	23.50
TOTAL RAINFALL (mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT =	0.95	0.20	0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0120)	Area (ha)= 0.17				
ID= 1 DT= 2.0 min	Total Imp(%)= 95.00	Dir. Conn.(%)= 95.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.16	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	33.67	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.	(mm/hr)=	84.39	13.49	
	over (min)	5.00	4.00	
Storage Coeff.	(min)=	1.42 (ii)	3.75 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	4.00	
Unit Hyd. peak	(cms)=	0.47	0.29	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.00	0.038 (iii)
TIME TO PEAK	(hrs)=	1.33	1.37	1.33
RUNOFF VOLUME	(mm)=	35.06	7.57	33.68
TOTAL RAINFALL	(mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT	=	0.95	0.20	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0121)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0112):	0.32	0.045	1.33	23.50
+ ID2= 2 (0120):	0.17	0.038	1.33	33.68
ID = 3 (0121):	0.49	0.083	1.33	27.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0115)	Area (ha)= 0.33				
ID= 1 DT= 2.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 30.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.23
Dep. Storage	(mm)=	2.00	5.00

Average Slope	(%)=	1.00	2.00	
Length	(m)=	46.90	40.00	
Mannings n	=	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.	(mm/hr)=	84.39	10.95	
	over (min)	5.00	20.00	
Storage Coeff.	(min)=	1.74 (ii)	18.83 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	20.00	
Unit Hyd. peak	(cms)=	0.43	0.06	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.024 (iii)
TIME TO PEAK	(hrs)=	1.33	1.67	1.33

RUNOFF VOLUME	(mm)=	35.06	7.57	15.78
TOTAL RAINFALL	(mm)=	37.06	37.06	37.06
RUNOFF COEFFICIENT	=	0.95	0.20	0.43

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0115):	0.33	0.024	1.33	15.78
+ ID2= 2 (0121):	0.49	0.083	1.33	27.03
ID = 3 (0122):	0.82	0.107	1.33	22.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.107	1.33	22.50
+ ID2= 2 (0162):	0.79	0.147	1.33	28.65
ID = 3 (0167):	1.61	0.254	1.33	25.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0140)	Area (ha)= 0.09				
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.02
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	24.49	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.15	1.033	20.33	2.033	5.50	3.03	2.59
0.067	2.15	1.067	20.33	2.067	5.50	3.07	2.59
0.100	2.15	1.100	20.33	2.100	5.50	3.10	2.59
0.133	2.15	1.133	20.33	2.133	5.50	3.13	2.59
0.167	2.15	1.167	20.33	2.167	5.50	3.17	2.59
0.200	2.49	1.200	84.39	2.200	4.60	3.20	2.39
0.233	2.49	1.233	84.39	2.233	4.60	3.23	2.39
0.267	2.49	1.267	84.39	2.267	4.60	3.27	2.39
0.300	2.49	1.300	84.39	2.300	4.60	3.30	2.39
0.333	2.49	1.333	84.39	2.333	4.60	3.33	2.39
0.367	2.98	1.367	26.99	2.367	3.97	3.37	2.23
0.400	2.98	1.400	26.99	2.400	3.97	3.40	2.23
0.433	2.98	1.433	26.99	2.433	3.97	3.43	2.23
0.467	2.98	1.467	26.99	2.467	3.97	3.47	2.23
0.500	2.98	1.500	26.99	2.500	3.97	3.50	2.23
0.533	3.73	1.533	13.71	2.533	3.49	3.53	2.08
0.567	3.73	1.567	13.71	2.567	3.49	3.57	2.08
0.600	3.73	1.600	13.71	2.600	3.49	3.60	2.08
0.633	3.73	1.633	13.71	2.633	3.49	3.63	2.08
0.667	3.73	1.667	13.71	2.667	3.49	3.67	2.08
0.700	5.04	1.700	9.12	2.700	3.13	3.70	1.95
0.733	5.04	1.733	9.12	2.733	3.13	3.73	1.95
0.767	5.04	1.767	9.12	2.767	3.13	3.77	1.95
0.800	5.04	1.800	9.12	2.800	3.13	3.80	1.95
0.833	5.04	1.833	9.12	2.833	3.13	3.83	1.95
0.867	7.98	1.867	6.85	2.867	2.83	3.87	1.84
0.900	7.98	1.900	6.85	2.900	2.83	3.90	1.84
0.933	7.98	1.933	6.85	2.933	2.83	3.93	1.84
0.967	7.98	1.967	6.85	2.967	2.83	3.97	1.84
1.000	7.98	2.000	6.85	3.000	2.83	4.00	1.84

Max.Eff.Inten.(mm/hr)=	84.39	8.16		
over (min)	5.00	6.00		
Storage Coeff. (min)=	1.18 (ii)	5.94 (ii)		
Unit Hyd. Tpeak (min)=	4.00	6.00		
Unit Hyd. peak (cms)=	0.49	0.19		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.016 (iii)	
TIME TO PEAK (hrs)=	1.33	1.40	1.33	
RUNOFF VOLUME (mm)=	35.06	4.76	27.77	
TOTAL RAINFALL (mm)=	37.06	37.06	37.06	
RUNOFF COEFFICIENT =	0.95	0.13	0.75	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
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Developed and Distributed by Smart City Water Inc

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\160fa023-9742-4aed-97c0-7e17e65e238e\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\160fa023-9742-4aed-97c0-7e17e65e238e\sc

DATE: 01-16-2026 TIME: 04:27:35

USER:

COMMENTS: _____


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  **********************************************
  ** SIMULATION : 4hr  Chicago 5yr             **
  **********************************************
```

CHICAGO STORM	IDF curve parameters: A=1214.000
Ptotal= 45.35 mm	B= 9.000
	C= 0.847

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.43	1.00	26.49	2.00	6.72	3.00	2.98
0.17	2.85	1.17	100.26	2.17	5.55	3.17	2.73
0.33	3.46	1.33	35.24	2.33	4.72	3.33	2.53
0.50	4.41	1.50	17.77	2.50	4.12	3.50	2.35
0.67	6.13	1.67	11.59	2.67	3.65	3.67	2.20
0.83	10.04	1.83	8.52	2.83	3.28	3.83	2.06

CALIB	
STANDHYD (0150)	Area (ha)= 0.38
ID= 1 DT= 2.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 80.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.30	0.08
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	50.33	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98

0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=	100.26	12.50		
over (min)	5.00	6.00		
Storage Coeff. (min)=	1.69 (ii)	5.74 (ii)		
Unit Hyd. Tpeak (min)=	4.00	6.00		
Unit Hyd. peak (cms)=	0.44	0.19		
			TOTALS	
PEAK FLOW (cms)=	0.08	0.00	0.086 (iii)	
TIME TO PEAK (hrs)=	1.33	1.40	1.33	
RUNOFF VOLUME (mm)=	43.35	7.26	36.12	
TOTAL RAINFALL (mm)=	45.35	45.35	45.35	
RUNOFF COEFFICIENT =	0.96	0.16	0.80	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0130)	Area (ha)= 0.13
ID= 1 DT= 2.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.13	0.00
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	29.44	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=	100.26	20.31	
over (min)	5.00	4.00	
Storage Coeff. (min)=	1.23 (ii)	2.35 (ii)	
Unit Hyd. Tpeak (min)=	4.00	4.00	
Unit Hyd. peak (cms)=	0.49	0.38	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.036 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	43.35	11.30	43.03
TOTAL RAINFALL (mm)=	45.35	45.35	45.35
RUNOFF COEFFICIENT =	0.96	0.25	0.95

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0153)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0130):	0.13	0.036	1.33	43.03
	+ ID2= 2 (0150):	0.38	0.086	1.33	36.12
	ID = 3 (0153):	0.51	0.122	1.33	37.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.28
ID= 1 DT= 2.0 min	Total Imp(%)= 68.00 Dir. Conn.(%)= 68.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.09
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	43.20	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=	100.26	12.50	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.54 (ii)	6.76 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.45	0.16	
			TOTALS
PEAK FLOW (cms)=	0.05	0.00	0.055 (iii)
TIME TO PEAK (hrs)=	1.33	1.43	1.33
RUNOFF VOLUME (mm)=	43.35	7.26	31.79
TOTAL RAINFALL (mm)=	45.35	45.35	45.35
RUNOFF COEFFICIENT =	0.96	0.16	0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0153):	0.51	0.122	1.33	37.88
	+ ID2= 2 (0160):	0.28	0.055	1.33	31.79
	ID = 3 (0162):	0.79	0.177	1.33	35.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0112)	Area (ha)= 0.32
ID= 1 DT= 2.0 min	Total Imp(%)= 58.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.13
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.19	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53

0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=	100.26	20.31	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.61 (ii)	7.80 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.45	0.14	
			TOTALS
PEAK FLOW (cms)=	0.05	0.01	0.055 (iii)
TIME TO PEAK (hrs)=	1.33	1.43	1.33
RUNOFF VOLUME (mm)=	43.35	11.30	29.87
TOTAL RAINFALL (mm)=	45.35	45.35	45.35
RUNOFF COEFFICIENT =	0.96	0.25	0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0120)	Area (ha)=	0.17	
ID= 1 DT= 2.0 min	Total Imp(%)=	95.00	Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.16	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	33.67	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=	100.26	20.31	
over (min)	5.00	4.00	
Storage Coeff. (min)=	1.33 (ii)	3.50 (ii)	
Unit Hyd. Tpeak (min)=	4.00	4.00	
Unit Hyd. peak (cms)=	0.48	0.30	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.045 (iii)
TIME TO PEAK (hrs)=	1.33	1.37	1.33
RUNOFF VOLUME (mm)=	43.35	11.30	41.74
TOTAL RAINFALL (mm)=	45.35	45.35	45.35
RUNOFF COEFFICIENT =	0.96	0.25	0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0121)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0112):		0.32	0.055	1.33	29.87
+ ID2= 2 (0120):		0.17	0.045	1.33	41.74
ID = 3 (0121):		0.49	0.101	1.33	33.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0115)	Area (ha)=	0.33	
ID= 1 DT= 2.0 min	Total Imp(%)=	30.00	Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.23
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.90	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73

0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53
0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=	100.26	17.18	
over (min)	5.00	16.00	
Storage Coeff. (min)=	1.62 (ii)	15.90 (ii)	
Unit Hyd. Tpeak (min)=	4.00	16.00	
Unit Hyd. peak (cms)=	0.44	0.07	
			TOTALS
PEAK FLOW (cms)=	0.03	0.01	0.029 (iii)
TIME TO PEAK (hrs)=	1.33	1.57	1.33
RUNOFF VOLUME (mm)=	43.35	11.30	20.88
TOTAL RAINFALL (mm)=	45.35	45.35	45.35
RUNOFF COEFFICIENT =	0.96	0.25	0.46

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0115):		0.33	0.029	1.33	20.88
+ ID2= 2 (0121):		0.49	0.101	1.33	33.99

ID = 3 (0122):	0.82	0.130	1.33	28.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.130	1.33	28.72
+ ID2= 2 (0162):	0.79	0.177	1.33	35.72
ID = 3 (0167):	1.61	0.307	1.33	32.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0140)	Area (ha)= 0.09
ID= 1 DT= 2.0 min	Total Imp(%)= 76.00 Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.02
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	24.49	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.43	1.033	26.49	2.033	6.72	3.03	2.98
0.067	2.43	1.067	26.49	2.067	6.72	3.07	2.98
0.100	2.43	1.100	26.49	2.100	6.72	3.10	2.98
0.133	2.43	1.133	26.49	2.133	6.72	3.13	2.98
0.167	2.43	1.167	26.49	2.167	6.72	3.17	2.98
0.200	2.85	1.200	100.26	2.200	5.55	3.20	2.73
0.233	2.85	1.233	100.26	2.233	5.55	3.23	2.73
0.267	2.85	1.267	100.26	2.267	5.55	3.27	2.73
0.300	2.85	1.300	100.26	2.300	5.55	3.30	2.73
0.333	2.85	1.333	100.26	2.333	5.55	3.33	2.73
0.367	3.46	1.367	35.24	2.367	4.72	3.37	2.53
0.400	3.46	1.400	35.24	2.400	4.72	3.40	2.53
0.433	3.46	1.433	35.24	2.433	4.72	3.43	2.53
0.467	3.46	1.467	35.24	2.467	4.72	3.47	2.53

0.500	3.46	1.500	35.24	2.500	4.72	3.50	2.53
0.533	4.41	1.533	17.77	2.533	4.12	3.53	2.35
0.567	4.41	1.567	17.77	2.567	4.12	3.57	2.35
0.600	4.41	1.600	17.77	2.600	4.12	3.60	2.35
0.633	4.41	1.633	17.77	2.633	4.12	3.63	2.35
0.667	4.41	1.667	17.77	2.667	4.12	3.67	2.35
0.700	6.13	1.700	11.59	2.700	3.65	3.70	2.20
0.733	6.13	1.733	11.59	2.733	3.65	3.73	2.20
0.767	6.13	1.767	11.59	2.767	3.65	3.77	2.20
0.800	6.13	1.800	11.59	2.800	3.65	3.80	2.20
0.833	6.13	1.833	11.59	2.833	3.65	3.83	2.20
0.867	10.04	1.867	8.52	2.867	3.28	3.87	2.06
0.900	10.04	1.900	8.52	2.900	3.28	3.90	2.06
0.933	10.04	1.933	8.52	2.933	3.28	3.93	2.06
0.967	10.04	1.967	8.52	2.967	3.28	3.97	2.06
1.000	10.04	2.000	8.52	3.000	3.28	4.00	2.06

Max.Eff.Inten.(mm/hr)=	100.26	12.50	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.10 (ii)	5.54 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.50	0.20	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.020 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	43.35	7.26	34.67
TOTAL RAINFALL (mm)=	45.35	45.35	45.35
RUNOFF COEFFICIENT =	0.96	0.16	0.76

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
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       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0c26a257-a7e0-46a1-89fe-d263e6ee0273\sc
Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\0c26a257-a7e0-46a1-89fe-d263e6ee0273\sc

DATE: 01-16-2026 TIME: 04:27:35

USER:

COMMENTS: _____

****
** SIMULATION : 4hr Chicago 10yr **
****

CHICAGO STORM	IDF curve parameters: A=1487.000
Ptotal= 52.06 mm	B= 10.200
	C= 0.858

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.71	1.00	31.26	2.00	7.77	3.00	3.34
0.17	3.20	1.17	112.80	2.17	6.37	3.17	3.06

0.33	3.90	1.33	41.55	2.33	5.39	3.33	2.82
0.50	5.03	1.50	21.01	2.50	4.67	3.50	2.61
0.67	7.06	1.67	13.60	2.67	4.13	3.67	2.43
0.83	11.75	1.83	9.93	2.83	3.69	3.83	2.28

CALIB	
STANDHYD (0150)	Area (ha)= 0.38
ID= 1 DT= 2.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 80.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.30	0.08
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	50.33	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43

0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=	112.80	16.48	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.61 (ii)	5.48 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.45	0.20	
			TOTALS
PEAK FLOW (cms)=	0.09	0.00	0.097 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	50.06	9.59	41.96
TOTAL RAINFALL (mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT =	0.96	0.18	0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0130)	Area (ha)= 0.13
ID= 1 DT= 2.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.13	0.00
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	29.44	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34

0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=	112.80	26.47	
over (min)	5.00	4.00	
Storage Coeff. (min)=	1.17 (ii)	2.24 (ii)	
Unit Hyd. Tpeak (min)=	4.00	4.00	
Unit Hyd. peak (cms)=	0.49	0.39	
			TOTALS
PEAK FLOW (cms)=	0.04	0.00	0.040 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	50.06	14.69	49.70
TOTAL RAINFALL (mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT =	0.96	0.28	0.95

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0153)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0130):	0.13	0.040	1.33	49.70
+ ID2= 2 (0150):	0.38	0.097	1.33	41.96
ID = 3 (0153):	0.51	0.138	1.33	43.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0160)	Area (ha)= 0.28
ID= 1 DT= 2.0 min	Total Imp(%)= 68.00 Dir. Conn.(%)= 68.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.19	0.09
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	43.20	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61

0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=	112.80	16.48	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.47 (ii)	6.45 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.46	0.16	
			TOTALS
PEAK FLOW (cms)=	0.06	0.00	0.062 (iii)
TIME TO PEAK (hrs)=	1.33	1.43	1.33
RUNOFF VOLUME (mm)=	50.06	9.59	37.10
TOTAL RAINFALL (mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT =	0.96	0.18	0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0153):	0.51	0.138	1.33	43.93
+ ID2= 2 (0160):	0.28	0.062	1.33	37.10
ID = 3 (0162):	0.79	0.200	1.33	41.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0112)	Area (ha)= 0.32
ID= 1 DT= 2.0 min	Total Imp(%)= 58.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.13
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.19	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

Max.Eff.Inten.(mm/hr)=		112.80	26.47
over (min)		5.00	8.00
Storage Coeff. (min)=		1.53 (ii)	7.44 (ii)
Unit Hyd. Tpeak (min)=		4.00	8.00

			TOTALS
Unit Hyd. peak (cms)=		0.45	0.15
PEAK FLOW	(cms)=	0.06	0.01	0.063 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	50.06	14.69	35.19
TOTAL RAINFALL	(mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT	=	0.96	0.28	0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0120) | Area (ha)= 0.17
ID= 1 DT= 2.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.16	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	33.67	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82

0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

				TOTALS
Max.Eff.Inten.(mm/hr)=		112.80	26.47	
over (min)		5.00	4.00	
Storage Coeff. (min)=		1.27 (ii)	3.34 (ii)	
Unit Hyd. Tpeak (min)=		4.00	4.00	
Unit Hyd. peak (cms)=		0.48	0.31	
PEAK FLOW	(cms)=	0.05	0.00	0.051 (iii)
TIME TO PEAK	(hrs)=	1.33	1.37	1.33
RUNOFF VOLUME	(mm)=	50.06	14.69	48.29
TOTAL RAINFALL	(mm)=	52.06	52.06	52.06
RUNOFF COEFFICIENT	=	0.96	0.28	0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0121) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0112):	0.32	0.063	1.33	35.19
+ ID2= 2 (0120):	0.17	0.051	1.33	48.29
ID = 3 (0121):	0.49	0.115	1.33	39.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0115) | Area (ha)= 0.33
ID= 1 DT= 2.0 min | Total Imp(%)= 30.00 Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.23
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.90	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

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     Max.Eff.Inten.(mm/hr)=     112.80        23.30
               over (min)        5.00        16.00
     Storage Coeff.  (min)=       1.55 (ii)   14.18 (ii)
     Unit Hyd. Tpeak (min)=       4.00        16.00
     Unit Hyd. peak  (cms)=       0.45         0.08
                                              *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.01          0.034 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.57           1.33
     RUNOFF VOLUME    (mm)=      50.06        14.69          25.27
     TOTAL RAINFALL   (mm)=      52.06        52.06          52.06
     RUNOFF COEFFICIENT   =       0.96         0.28           0.49

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  71.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0122)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0115):     0.33   0.034     1.33    25.27
     + ID2= 2 (  0121):     0.49   0.115     1.33    39.73
       ========================================================
       ID = 3 (  0122):     0.82   0.148     1.33    33.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0167)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0122):     0.82   0.148     1.33    33.91
     + ID2= 2 (  0162):     0.79   0.200     1.33    41.51
       ========================================================
       ID = 3 (  0167):     1.61   0.348     1.33    37.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0140)|   Area    (ha)=   0.09
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|ID= 1 DT= 2.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
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                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.02
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      24.49        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	2.71	1.033	31.26	2.033	7.77	3.03	3.34
0.067	2.71	1.067	31.26	2.067	7.77	3.07	3.34
0.100	2.71	1.100	31.26	2.100	7.77	3.10	3.34
0.133	2.71	1.133	31.26	2.133	7.77	3.13	3.34
0.167	2.71	1.167	31.26	2.167	7.77	3.17	3.34
0.200	3.20	1.200	112.80	2.200	6.37	3.20	3.06
0.233	3.20	1.233	112.80	2.233	6.37	3.23	3.06
0.267	3.20	1.267	112.80	2.267	6.37	3.27	3.06
0.300	3.20	1.300	112.80	2.300	6.37	3.30	3.06
0.333	3.20	1.333	112.80	2.333	6.37	3.33	3.06
0.367	3.90	1.367	41.55	2.367	5.39	3.37	2.82
0.400	3.90	1.400	41.55	2.400	5.39	3.40	2.82
0.433	3.90	1.433	41.55	2.433	5.39	3.43	2.82
0.467	3.90	1.467	41.55	2.467	5.39	3.47	2.82
0.500	3.90	1.500	41.55	2.500	5.39	3.50	2.82
0.533	5.03	1.533	21.01	2.533	4.67	3.53	2.61
0.567	5.03	1.567	21.01	2.567	4.67	3.57	2.61
0.600	5.03	1.600	21.01	2.600	4.67	3.60	2.61
0.633	5.03	1.633	21.01	2.633	4.67	3.63	2.61
0.667	5.03	1.667	21.01	2.667	4.67	3.67	2.61
0.700	7.06	1.700	13.60	2.700	4.13	3.70	2.43
0.733	7.06	1.733	13.60	2.733	4.13	3.73	2.43
0.767	7.06	1.767	13.60	2.767	4.13	3.77	2.43
0.800	7.06	1.800	13.60	2.800	4.13	3.80	2.43
0.833	7.06	1.833	13.60	2.833	4.13	3.83	2.43
0.867	11.75	1.867	9.93	2.867	3.69	3.87	2.28
0.900	11.75	1.900	9.93	2.900	3.69	3.90	2.28
0.933	11.75	1.933	9.93	2.933	3.69	3.93	2.28
0.967	11.75	1.967	9.93	2.967	3.69	3.97	2.28
1.000	11.75	2.000	9.93	3.000	3.69	4.00	2.28

```
     Max.Eff.Inten.(mm/hr)=     112.80        16.48
               over (min)        5.00         6.00
     Storage Coeff.  (min)=       1.05 (ii)    5.29 (ii)
```



```
     Unit Hyd. Tpeak (min)=       4.00         6.00
     Unit Hyd. peak  (cms)=       0.51         0.20
                                              *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.022 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.40           1.33
     RUNOFF VOLUME    (mm)=      50.06         9.59          40.32
     TOTAL RAINFALL   (mm)=      52.06        52.06          52.06
     RUNOFF COEFFICIENT   =       0.96         0.18           0.77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\35
d6d95b-944c-4375-ac3b-1180f3ea9acc\sc
  Summary filename:
C:\Users\Yuan.Yuan\AppData\Local\Civica\VH5\35c4d2a0-d087-4034-8308-8cdbba656ae8\35
d6d95b-944c-4375-ac3b-1180f3ea9acc\sc
```



```
DATE: 01-16-2026                          TIME: 04:27:35

USER:


COMMENTS: _____________________________________________________

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  ***********************************************
  ** SIMULATION : 4hr Chicago 25yr              **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1898.000
| Ptotal= 61.52 mm |                          B=  11.700
--------------------                          C=   0.871
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.09	1.00	38.05	2.00	9.28	3.00	3.85
0.17	3.67	1.17	130.09	2.17	7.55	3.17	3.50
0.33	4.53	1.33	50.47	2.33	6.34	3.33	3.22
0.50	5.90	1.50	25.68	2.50	5.46	3.50	2.97
0.67	8.40	1.67	16.52	2.67	4.80	3.67	2.76
0.83	14.22	1.83	11.95	2.83	4.27	3.83	2.58

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--------------------
| CALIB            |
| STANDHYD (  0150)|   Area    (ha)=   0.38
|ID= 1 DT= 2.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.30         0.08
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      50.33        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=	130.09	22.74		
over (min)	5.00	6.00		
Storage Coeff. (min)=	1.52 (ii)	5.17 (ii)		
Unit Hyd. Tpeak (min)=	4.00	6.00		
Unit Hyd. peak (cms)=	0.45	0.21		
			TOTALS	
PEAK FLOW (cms)=	0.11	0.00	0.113 (iii)	
TIME TO PEAK (hrs)=	1.33	1.40	1.33	
RUNOFF VOLUME (mm)=	59.52	13.29	50.27	
TOTAL RAINFALL (mm)=	61.52	61.52	61.52	
RUNOFF COEFFICIENT =	0.97	0.22	0.82	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

Chicago 4 hr_Proposed Conditions

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0130)	Area (ha)=	0.13	
ID= 1 DT= 2.0 min	Total Imp(%)=	99.00	Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.13	0.00
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	29.44	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76

Chicago 4 hr_Proposed Conditions

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=	130.09	36.14		
over (min)	5.00	4.00		
Storage Coeff. (min)=	1.10 (ii)	2.12 (ii)		
Unit Hyd. Tpeak (min)=	4.00	4.00		
Unit Hyd. peak (cms)=	0.50	0.40		
			TOTALS	
PEAK FLOW (cms)=	0.05	0.00	0.047 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	59.52	19.94	59.13	
TOTAL RAINFALL (mm)=	61.52	61.52	61.52	
RUNOFF COEFFICIENT =	0.97	0.32	0.96	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0153)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0130):	0.13	0.047	1.33	59.13
+ ID2= 2 (0150):	0.38	0.113	1.33	50.27
ID = 3 (0153):	0.51	0.160	1.33	52.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)=	0.28	
ID= 1 DT= 2.0 min	Total Imp(%)=	68.00	Dir. Conn.(%)= 68.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.09
Dep. Storage	(mm)=	2.00	5.00

Chicago 4 hr_Proposed Conditions

Average Slope	(%)=	1.00	2.00
Length	(m)=	43.20	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=	130.09	22.74		
over (min)	5.00	8.00		
Storage Coeff. (min)=	1.39 (ii)	6.09 (ii)		
Unit Hyd. Tpeak (min)=	4.00	8.00		
Unit Hyd. peak (cms)=	0.47	0.17		
			TOTALS	
PEAK FLOW (cms)=	0.07	0.00	0.072 (iii)	
TIME TO PEAK (hrs)=	1.33	1.43	1.33	

RUNOFF VOLUME	(mm)=	59.52	13.29	44.72
TOTAL RAINFALL	(mm)=	61.52	61.52	61.52
RUNOFF COEFFICIENT	=	0.97	0.22	0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0153):	0.51	0.160	1.33	52.53
+ ID2= 2 (0160):	0.28	0.072	1.33	44.72
ID = 3 (0162):	0.79	0.232	1.33	49.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0112) \| Area (ha)= 0.32
ID= 1 DT= 2.0 min \| Total Imp(%)= 58.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.13
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.19	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.	(mm/hr)=	130.09	36.14	
	over (min)	5.00	8.00	
Storage Coeff.	(min)=	1.45 (ii)	7.03 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	8.00	
Unit Hyd. peak	(cms)=	0.46	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.07	0.01	0.075 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	59.52	19.94	42.89
TOTAL RAINFALL	(mm)=	61.52	61.52	61.52
RUNOFF COEFFICIENT	=	0.97	0.32	0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0120) \| Area (ha)= 0.17

ID= 1 DT= 2.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.16	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	33.67	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.	(mm/hr)=	130.09	36.14	
	over (min)	5.00	4.00	
Storage Coeff.	(min)=	1.20 (ii)	3.15 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	4.00	
Unit Hyd. peak	(cms)=	0.49	0.32	
				TOTALS
PEAK FLOW	(cms)=	0.06	0.00	0.059 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	59.52	19.94	57.54
TOTAL RAINFALL	(mm)=	61.52	61.52	61.52
RUNOFF COEFFICIENT	=	0.97	0.32	0.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0121) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0112):	0.32	0.075	1.33	42.89
+ ID2= 2 (0120):	0.17	0.059	1.33	57.54
ID = 3 (0121):	0.49	0.134	1.33	47.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0115) \| Area (ha)= 0.33
ID= 1 DT= 2.0 min \| Total Imp(%)= 30.00 Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.23
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.90	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85

0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85
0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=	130.09	33.51		
over (min)	5.00	14.00		
Storage Coeff. (min)=	1.46 (ii)	12.39 (ii)		
Unit Hyd. Tpeak (min)=	4.00	14.00		
Unit Hyd. peak (cms)=	0.46	0.09		
			TOTALS	
PEAK FLOW (cms)=	0.04	0.01	0.041 (iii)	
TIME TO PEAK (hrs)=	1.33	1.53	1.33	
RUNOFF VOLUME (mm)=	59.52	19.94	31.79	
TOTAL RAINFALL (mm)=	61.52	61.52	61.52	
RUNOFF COEFFICIENT =	0.97	0.32	0.52	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0115):	0.33	0.041	1.33	31.79
+ ID2= 2 (0121):	0.49	0.134	1.33	47.97
ID = 3 (0122):	0.82	0.175	1.33	41.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0122):	0.82	0.175	1.33	41.46
+ ID2= 2 (0162):	0.79	0.232	1.33	49.76
ID = 3 (0167):	1.61	0.407	1.33	45.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)| ID= 1 DT= 2.0 min	Area (ha)= 0.09	Total Imp(%)= 76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.02
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	24.49	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.09	1.033	38.05	2.033	9.28	3.03	3.85
0.067	3.09	1.067	38.05	2.067	9.28	3.07	3.85
0.100	3.09	1.100	38.05	2.100	9.28	3.10	3.85
0.133	3.09	1.133	38.05	2.133	9.28	3.13	3.85
0.167	3.09	1.167	38.05	2.167	9.28	3.17	3.85

0.200	3.67	1.200	130.09	2.200	7.55	3.20	3.50
0.233	3.67	1.233	130.09	2.233	7.55	3.23	3.50
0.267	3.67	1.267	130.09	2.267	7.55	3.27	3.50
0.300	3.67	1.300	130.09	2.300	7.55	3.30	3.50
0.333	3.67	1.333	130.09	2.333	7.55	3.33	3.50
0.367	4.53	1.367	50.47	2.367	6.34	3.37	3.22
0.400	4.53	1.400	50.47	2.400	6.34	3.40	3.22
0.433	4.53	1.433	50.47	2.433	6.34	3.43	3.22
0.467	4.53	1.467	50.47	2.467	6.34	3.47	3.22
0.500	4.53	1.500	50.47	2.500	6.34	3.50	3.22
0.533	5.90	1.533	25.68	2.533	5.46	3.53	2.97
0.567	5.90	1.567	25.68	2.567	5.46	3.57	2.97
0.600	5.90	1.600	25.68	2.600	5.46	3.60	2.97
0.633	5.90	1.633	25.68	2.633	5.46	3.63	2.97
0.667	5.90	1.667	25.68	2.667	5.46	3.67	2.97
0.700	8.40	1.700	16.52	2.700	4.80	3.70	2.76
0.733	8.40	1.733	16.52	2.733	4.80	3.73	2.76
0.767	8.40	1.767	16.52	2.767	4.80	3.77	2.76
0.800	8.40	1.800	16.52	2.800	4.80	3.80	2.76
0.833	8.40	1.833	16.52	2.833	4.80	3.83	2.76
0.867	14.22	1.867	11.95	2.867	4.27	3.87	2.58
0.900	14.22	1.900	11.95	2.900	4.27	3.90	2.58
0.933	14.22	1.933	11.95	2.933	4.27	3.93	2.58
0.967	14.22	1.967	11.95	2.967	4.27	3.97	2.58
1.000	14.22	2.000	11.95	3.000	4.27	4.00	2.58

Max.Eff.Inten.(mm/hr)=	130.09	22.74		
over (min)	5.00	6.00		
Storage Coeff. (min)=	0.99 (ii)	4.99 (ii)		
Unit Hyd. Tpeak (min)=	4.00	6.00		
Unit Hyd. peak (cms)=	0.51	0.21		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.00	0.026 (iii)	
TIME TO PEAK (hrs)=	1.33	1.40	1.33	
RUNOFF VOLUME (mm)=	59.52	13.29	48.40	
TOTAL RAINFALL (mm)=	61.52	61.52	61.52	
RUNOFF COEFFICIENT =	0.97	0.22	0.79	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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V    V   I    SSSSS  U   U    A    L              (v 6.2.2020)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
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Summary filename:
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DATE: 01-16-2026 TIME: 04:27:35

USER:

COMMENTS: _____

****
** SIMULATION : 4hr Chicago 50yr **
****

CHICAGO STORM | Ptotal= 68.70 mm	IDF curve parameters: A=2110.000 B= 12.000 C= 0.870

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.49	1.00	42.63	2.00	10.48	3.00	4.35
0.17	4.15	1.17	143.34	2.17	8.52	3.17	3.96
0.33	5.11	1.33	56.43	2.33	7.17	3.33	3.63
0.50	6.66	1.50	28.88	2.50	6.17	3.50	3.36
0.67	9.49	1.67	18.62	2.67	5.42	3.67	3.12
0.83	16.03	1.83	13.49	2.83	4.82	3.83	2.92

CALIB			
STANDHYD (0150)	Area (ha)= 0.38		
ID= 1 DT= 2.0 min	Total Imp(%)= 80.00	Dir. Conn.(%)= 80.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.30	0.08
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	50.33	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63

0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

			TOTALS
Max.Eff.Inten.(mm/hr)=	143.34	28.09	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.47 (ii)	4.98 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.46	0.21	
PEAK FLOW (cms)=	0.12	0.01	0.125 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	66.70	16.39	56.64
TOTAL RAINFALL (mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT =	0.97	0.24	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0130)	Area (ha)= 0.13		
ID= 1 DT= 2.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.13	0.00
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	29.44	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

			TOTALS
Max.Eff.Inten.(mm/hr)=	143.34	44.15	
over (min)	5.00	4.00	
Storage Coeff. (min)=	1.06 (ii)	2.03 (ii)	
Unit Hyd. Tpeak (min)=	4.00	4.00	
Unit Hyd. peak (cms)=	0.51	0.41	
PEAK FLOW (cms)=	0.05	0.00	0.051 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	66.70	24.24	66.28
TOTAL RAINFALL (mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT =	0.97	0.35	0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0153)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0130):	0.13	0.051	1.33	66.28
+ ID2= 2 (0150):	0.38	0.125	1.33	56.64
ID = 3 (0153):	0.51	0.177	1.33	59.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0160)	Area (ha)= 0.28		
ID= 1 DT= 2.0 min	Total Imp(%)= 68.00	Dir. Conn.(%)= 68.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.09
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	43.20	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96

0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=	143.34	28.09		
over (min)	5.00	6.00		
Storage Coeff. (min)=	1.34 (ii)	5.86 (ii)		
Unit Hyd. Tpeak (min)=	4.00	6.00		
Unit Hyd. peak (cms)=	0.47	0.19		
			TOTALS	
PEAK FLOW (cms)=	0.08	0.01	0.081 (iii)	
TIME TO PEAK (hrs)=	1.33	1.40	1.33	
RUNOFF VOLUME (mm)=	66.70	16.39	50.59	
TOTAL RAINFALL (mm)=	68.70	68.70	68.70	
RUNOFF COEFFICIENT =	0.97	0.24	0.74	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0162)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0153):	0.51	0.177	1.33	59.09
+ ID2= 2 (0160):	0.28	0.081	1.33	50.59

ID = 3 (0162): 0.79 0.258 1.33 56.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0112)	Area (ha)= 0.32
ID= 1 DT= 2.0 min	Total Imp(%)= 58.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.19	0.13
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.19	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92

0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=	143.34	44.15		
over (min)	5.00	8.00		
Storage Coeff. (min)=	1.39 (ii)	6.76 (ii)		
Unit Hyd. Tpeak (min)=	4.00	8.00		
Unit Hyd. peak (cms)=	0.47	0.16		
			TOTALS	
PEAK FLOW (cms)=	0.07	0.01	0.084 (iii)	
TIME TO PEAK (hrs)=	1.33	1.43	1.33	
RUNOFF VOLUME (mm)=	66.70	24.24	48.86	
TOTAL RAINFALL (mm)=	68.70	68.70	68.70	
RUNOFF COEFFICIENT =	0.97	0.35	0.71	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0120)	Area (ha)= 0.17
ID= 1 DT= 2.0 min	Total Imp(%)= 95.00 Dir. Conn.(%)= 95.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.16	0.01
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	33.67	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=	143.34	44.15		
over (min)	5.00	4.00		
Storage Coeff. (min)=	1.15 (ii)	3.03 (ii)		
Unit Hyd. Tpeak (min)=	4.00	4.00		
Unit Hyd. peak (cms)=	0.50	0.33		
			TOTALS	
PEAK FLOW (cms)=	0.06	0.00	0.065 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	66.70	24.24	64.58	
TOTAL RAINFALL (mm)=	68.70	68.70	68.70	
RUNOFF COEFFICIENT =	0.97	0.35	0.94	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0121)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0112):		0.32	0.084	1.33	48.86
+ ID2= 2 (0120):		0.17	0.065	1.33	64.58
ID = 3 (0121):		0.49	0.149	1.33	54.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0115)	Area (ha)=	0.33	
ID= 1 DT= 2.0 min	Total Imp(%)=	30.00	Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.23
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.90	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=		143.34	44.15
over (min)		5.00	12.00
Storage Coeff. (min)=		1.40 (ii)	11.19 (ii)
Unit Hyd. Tpeak (min)=		4.00	12.00
Unit Hyd. peak (cms)=		0.47	0.10

				TOTALS
PEAK FLOW	(cms)=	0.02	0.04	0.048 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	24.24	36.96	36.96
TOTAL RAINFALL	(mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT	=	0.97	0.35	0.54

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0122)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0115):		0.33	0.048	1.33	36.96
+ ID2= 2 (0121):		0.49	0.149	1.33	54.31
ID = 3 (0122):		0.82	0.197	1.33	47.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0167)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0122):		0.82	0.197	1.33	47.33

ID2= 2 (0162):		0.79	0.258	1.33	56.08
ID = 3 (0167):		1.61	0.455	1.33	51.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0140)	Area (ha)=	0.09	
ID= 1 DT= 2.0 min	Total Imp(%)=	76.00	Dir. Conn.(%)= 76.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.02
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	24.49	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	3.49	1.033	42.63	2.033	10.48	3.03	4.35
0.067	3.49	1.067	42.63	2.067	10.48	3.07	4.35
0.100	3.49	1.100	42.63	2.100	10.48	3.10	4.35
0.133	3.49	1.133	42.63	2.133	10.48	3.13	4.35
0.167	3.49	1.167	42.63	2.167	10.48	3.17	4.35
0.200	4.15	1.200	143.34	2.200	8.52	3.20	3.96
0.233	4.15	1.233	143.34	2.233	8.52	3.23	3.96
0.267	4.15	1.267	143.34	2.267	8.52	3.27	3.96
0.300	4.15	1.300	143.34	2.300	8.52	3.30	3.96
0.333	4.15	1.333	143.34	2.333	8.52	3.33	3.96
0.367	5.11	1.367	56.43	2.367	7.17	3.37	3.63
0.400	5.11	1.400	56.43	2.400	7.17	3.40	3.63
0.433	5.11	1.433	56.43	2.433	7.17	3.43	3.63
0.467	5.11	1.467	56.43	2.467	7.17	3.47	3.63
0.500	5.11	1.500	56.43	2.500	7.17	3.50	3.63
0.533	6.66	1.533	28.88	2.533	6.17	3.53	3.36
0.567	6.66	1.567	28.88	2.567	6.17	3.57	3.36
0.600	6.66	1.600	28.88	2.600	6.17	3.60	3.36
0.633	6.66	1.633	28.88	2.633	6.17	3.63	3.36
0.667	6.66	1.667	28.88	2.667	6.17	3.67	3.36
0.700	9.49	1.700	18.62	2.700	5.42	3.70	3.12
0.733	9.49	1.733	18.62	2.733	5.42	3.73	3.12
0.767	9.49	1.767	18.62	2.767	5.42	3.77	3.12
0.800	9.49	1.800	18.62	2.800	5.42	3.80	3.12
0.833	9.49	1.833	18.62	2.833	5.42	3.83	3.12
0.867	16.03	1.867	13.49	2.867	4.82	3.87	2.92
0.900	16.03	1.900	13.49	2.900	4.82	3.90	2.92
0.933	16.03	1.933	13.49	2.933	4.82	3.93	2.92
0.967	16.03	1.967	13.49	2.967	4.82	3.97	2.92
1.000	16.03	2.000	13.49	3.000	4.82	4.00	2.92

Max.Eff.Inten.(mm/hr)=		143.34	28.09
over (min)		5.00	6.00
Storage Coeff. (min)=		0.95 (ii)	4.80 (ii)
Unit Hyd. Tpeak (min)=		4.00	6.00
Unit Hyd. peak (cms)=		0.52	0.22

				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK	(hrs)=	1.33	1.40	1.33
RUNOFF VOLUME	(mm)=	16.39	54.61	54.61
TOTAL RAINFALL	(mm)=	68.70	68.70	68.70
RUNOFF COEFFICIENT	=	0.97	0.24	0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 58.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

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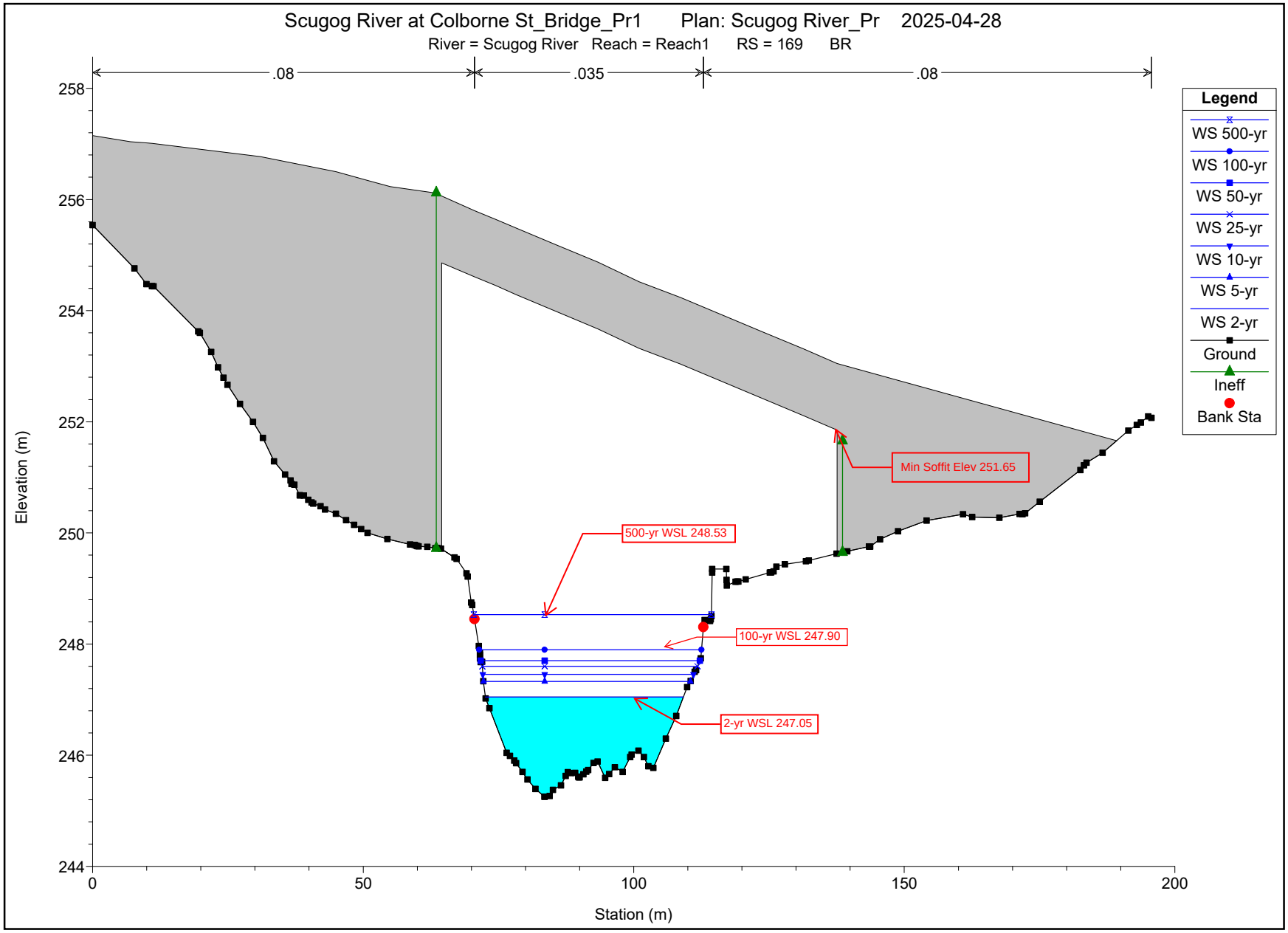
D

Appendix D

Hydraulic Analysis


Scugog River at Colborne St_Bridge_Pr1 Plan: Scugog River_Pr 2025-04-28
River = Scugog River Reach = Reach1 RS = 169 BR
.08
.035
.08
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Min Soffit Elev 251.65
500-yr WSL 248.53
100-yr WSL 247.90
2-yr WSL 247.05
Elevation (m)
Station (m)
258
256
254
252
250
248
246
244
0
50
100
150
200

Scugog River HEC-RAS Hydraulic Model

Proposed Conditions Hydraulic Analysis Summary

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude #
			(m3/s)	(m)	(m)	(m)	(m)	(m/s)	(m2)	(m)	
Reach1	294.65	2-yr	37.5	245.43	247.12	246.32	247.19	1.19	31.64	24.16	0.33
Reach1	294.65	5-yr	51.7	245.43	247.40	246.50	247.49	1.34	38.53	25.92	0.35
Reach1	294.65	10-yr	59.8	245.43	247.53	246.59	247.63	1.43	41.91	26.72	0.36
Reach1	294.65	25-yr	70	245.43	247.67	246.70	247.79	1.53	45.79	27.57	0.38
Reach1	294.65	50-yr	78.1	245.43	247.77	246.79	247.90	1.60	48.70	28.20	0.39
Reach1	294.65	100-yr	95.3	245.43	247.97	246.96	248.13	1.75	54.34	29.37	0.41
Reach1	294.65	500-yr	170.4	245.43	248.61	247.57	248.88	2.30	74.30	33.30	0.48
Reach1	278.01	2-yr	37.5	245.24	247.13	246.08	247.17	0.94	39.83	26.42	0.24
Reach1	278.01	5-yr	51.7	245.24	247.40	246.25	247.46	1.09	47.26	27.32	0.27
Reach1	278.01	10-yr	59.8	245.24	247.53	246.34	247.60	1.18	50.81	27.74	0.28
Reach1	278.01	25-yr	70	245.24	247.67	246.44	247.76	1.28	54.83	28.34	0.29
Reach1	278.01	50-yr	78.1	245.24	247.78	246.52	247.87	1.35	57.82	28.77	0.30
Reach1	278.01	100-yr	95.3	245.24	247.98	246.68	248.09	1.50	63.55	29.55	0.33
Reach1	278.01	500-yr	170.4	245.24	248.62	247.24	248.83	2.04	83.33	32.36	0.41
Reach1	257.93	2-yr	37.5	245.35	247.12	246.15	247.16	0.90	41.80	30.97	0.25
Reach1	257.93	5-yr	51.7	245.35	247.39	246.31	247.45	1.02	50.62	32.34	0.26
Reach1	257.93	10-yr	59.8	245.35	247.52	246.39	247.58	1.09	54.83	32.68	0.27
Reach1	257.93	25-yr	70	245.35	247.67	246.48	247.74	1.18	59.57	33.04	0.28
Reach1	257.93	50-yr	78.1	245.35	247.77	246.56	247.85	1.24	63.06	33.28	0.29
Reach1	257.93	100-yr	95.3	245.35	247.97	246.70	248.07	1.37	69.69	33.79	0.30
Reach1	257.93	500-yr	170.4	245.35	248.62	247.23	248.79	1.86	92.02	36.02	0.36
Reach1	239.97	2-yr	37.5	245.37	247.10	246.22	247.14	0.93	40.50	31.78	0.26
Reach1	239.97	5-yr	51.7	245.37	247.38	246.37	247.43	1.04	49.50	32.94	0.27
Reach1	239.97	10-yr	59.8	245.37	247.51	246.45	247.57	1.11	53.77	33.34	0.28
Reach1	239.97	25-yr	70	245.37	247.65	246.55	247.72	1.19	58.58	33.71	0.29
Reach1	239.97	50-yr	78.1	245.37	247.75	246.61	247.83	1.26	62.13	33.94	0.30
Reach1	239.97	100-yr	95.3	245.37	247.95	246.75	248.05	1.39	68.83	34.36	0.31
Reach1	239.97	500-yr	170.4	245.37	248.59	247.27	248.77	1.88	91.31	37.20	0.37
Reach1	224.24	2-yr	37.5	245.40	247.09	246.27	247.13	0.95	39.64	32.70	0.27
Reach1	224.24	5-yr	51.7	245.40	247.36	246.42	247.42	1.06	48.97	34.37	0.28
Reach1	224.24	10-yr	59.8	245.40	247.49	246.49	247.56	1.12	53.46	35.22	0.29
Reach1	224.24	25-yr	70	245.40	247.64	246.59	247.71	1.19	58.58	36.22	0.30
Reach1	224.24	50-yr	78.1	245.40	247.74	246.66	247.82	1.25	62.41	36.61	0.31
Reach1	224.24	100-yr	95.3	245.40	247.94	246.79	248.03	1.37	69.65	37.05	0.32
Reach1	224.24	500-yr	170.4	245.40	248.58	247.29	248.75	1.82	93.90	39.91	0.37
Reach1	201.65	2-yr	37.5	245.36	247.06	246.30	247.11	0.99	37.71	31.97	0.29
Reach1	201.65	5-yr	51.7	245.36	247.34	246.45	247.40	1.10	46.86	34.12	0.30
Reach1	201.65	10-yr	59.8	245.36	247.46	246.52	247.53	1.17	51.31	35.29	0.31
Reach1	201.65	25-yr	70	245.36	247.61	246.61	247.68	1.24	56.37	35.78	0.32
Reach1	201.65	50-yr	78.1	245.36	247.71	246.68	247.80	1.30	60.10	36.04	0.32
Reach1	201.65	100-yr	95.3	245.36	247.90	246.82	248.01	1.42	67.16	36.46	0.33
Reach1	201.65	500-yr	170.4	245.36	248.53	247.33	248.72	1.88	90.71	38.26	0.39
Reach1	186.86	2-yr	37.5	245.25	247.05	246.26	247.09	0.88	42.53	36.60	0.26

Scugog River HEC-RAS Hydraulic Model

Proposed Conditions Hydraulic Analysis Summary

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude #
			(m3/s)	(m)	(m)	(m)	(m)	(m/s)	(m2)	(m)	
Reach1	186.86	5-yr	51.7	245.25	247.33	246.40	247.38	0.98	52.93	38.26	0.27
Reach1	186.86	10-yr	59.8	245.25	247.46	246.47	247.51	1.03	57.89	38.93	0.27
Reach1	186.86	25-yr	70	245.25	247.60	246.56	247.66	1.10	63.51	39.78	0.28
Reach1	186.86	50-yr	78.1	245.25	247.71	246.62	247.77	1.15	67.69	40.54	0.29
Reach1	186.86	100-yr	95.3	245.25	247.90	246.75	247.98	1.26	75.67	41.05	0.30
Reach1	186.86	500-yr	170.4	245.25	248.54	247.20	248.68	1.67	102.42	43.93	0.34
			Bridge								
Reach1	151.09	2-yr	37.5	245.18	247.03	246.11	247.06	0.84	44.50	37.54	0.25
Reach1	151.09	5-yr	51.7	245.18	247.31	246.27	247.35	0.93	55.34	39.84	0.25
Reach1	151.09	10-yr	59.8	245.18	247.43	246.34	247.48	0.99	60.56	41.60	0.26
Reach1	151.09	25-yr	70	245.18	247.58	246.43	247.63	1.06	66.60	43.38	0.27
Reach1	151.09	50-yr	78.1	245.18	247.68	246.50	247.74	1.11	71.17	44.44	0.27
Reach1	151.09	100-yr	95.3	245.18	247.87	246.65	247.95	1.21	79.89	45.24	0.28
Reach1	151.09	500-yr	170.4	245.18	248.50	247.14	248.64	1.62	109.07	47.33	0.32
Reach1	128.2	2-yr	37.5	245.18	246.95	246.26	247.03	1.20	31.30	31.38	0.38
Reach1	128.2	5-yr	51.7	245.18	247.23	246.45	247.31	1.28	40.48	35.06	0.38
Reach1	128.2	10-yr	59.8	245.18	247.36	246.54	247.45	1.33	45.05	37.05	0.38
Reach1	128.2	25-yr	70	245.18	247.50	246.66	247.60	1.39	50.24	37.55	0.38
Reach1	128.2	50-yr	78.1	245.18	247.60	246.74	247.70	1.44	54.07	38.08	0.39
Reach1	128.2	100-yr	95.3	245.18	247.79	246.93	247.91	1.55	61.34	39.47	0.40
Reach1	128.2	500-yr	170.4	245.18	248.38	247.43	248.59	2.00	85.76	42.46	0.44
Reach1	100	2-yr	37.8	245.17	246.92	246.19	246.98	1.07	35.32	33.62	0.33
Reach1	100	5-yr	52.1	245.17	247.20	246.36	247.27	1.15	45.49	39.12	0.34
Reach1	100	10-yr	60.2	245.17	247.33	246.45	247.40	1.19	50.59	41.11	0.34
Reach1	100	25-yr	70.4	245.17	247.47	246.54	247.55	1.25	56.75	49.41	0.35
Reach1	100	50-yr	78.6	245.17	247.57	246.61	247.66	1.29	62.04	52.64	0.35
Reach1	100	100-yr	96	245.17	247.76	246.78	247.86	1.37	72.52	57.12	0.35
Reach1	100	500-yr	171.5	245.17	248.38	247.30	248.52	1.69	114.16	76.34	0.37

Scugog River HEC-RAS Hydraulic Model

Existing Conditions Hydraulic Analysis Summary

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude #
			(m3/s)	(m)	(m)	(m)	(m)	(m/s)	(m2)	(m)	
Reach1	294.65	2-yr	37.5	245.43	247.11	246.32	247.18	1.20	31.30	24.07	0.34
Reach1	294.65	5-yr	51.7	245.43	247.38	246.50	247.48	1.36	38.14	25.83	0.36
Reach1	294.65	10-yr	59.8	245.43	247.51	246.59	247.62	1.44	41.49	26.62	0.37
Reach1	294.65	25-yr	70	245.43	247.65	246.70	247.77	1.54	45.34	27.47	0.38
Reach1	294.65	50-yr	78.1	245.43	247.76	246.79	247.89	1.62	48.22	28.10	0.39
Reach1	294.65	100-yr	95.3	245.43	247.95	246.96	248.11	1.77	53.79	29.26	0.42
Reach1	294.65	500-yr	170.4	245.43	248.58	247.57	248.86	2.33	73.44	33.07	0.49
Reach1	278.01	2-yr	37.5	245.24	247.11	246.08	247.16	0.95	39.45	26.37	0.25
Reach1	278.01	5-yr	51.7	245.24	247.39	246.25	247.45	1.10	46.85	27.28	0.27
Reach1	278.01	10-yr	59.8	245.24	247.52	246.34	247.59	1.19	50.38	27.67	0.28
Reach1	278.01	25-yr	70	245.24	247.66	246.44	247.74	1.29	54.37	28.27	0.30
Reach1	278.01	50-yr	78.1	245.24	247.76	246.52	247.86	1.36	57.34	28.70	0.31
Reach1	278.01	100-yr	95.3	245.24	247.96	246.68	248.07	1.51	63.00	29.48	0.33
Reach1	278.01	500-yr	170.4	245.24	248.59	247.24	248.81	2.07	82.49	32.24	0.41
Reach1	257.93	2-yr	37.5	245.35	247.10	246.15	247.14	0.91	41.36	30.87	0.25
Reach1	257.93	5-yr	51.7	245.35	247.38	246.31	247.43	1.03	50.12	32.30	0.26
Reach1	257.93	10-yr	59.8	245.35	247.51	246.39	247.57	1.10	54.31	32.64	0.27
Reach1	257.93	25-yr	70	245.35	247.65	246.48	247.72	1.19	59.02	33.00	0.28
Reach1	257.93	50-yr	78.1	245.35	247.76	246.56	247.83	1.25	62.50	33.24	0.29
Reach1	257.93	100-yr	95.3	245.35	247.95	246.70	248.05	1.38	69.06	33.74	0.31
Reach1	257.93	500-yr	170.4	245.35	248.59	247.23	248.77	1.88	91.09	35.45	0.37
Reach1	239.97	2-yr	37.5	245.37	247.08	246.22	247.13	0.94	40.02	31.68	0.27
Reach1	239.97	5-yr	51.7	245.37	247.36	246.37	247.42	1.06	48.97	32.89	0.28
Reach1	239.97	10-yr	59.8	245.37	247.49	246.45	247.55	1.12	53.23	33.29	0.28
Reach1	239.97	25-yr	70	245.37	247.63	246.55	247.71	1.21	58.00	33.67	0.29
Reach1	239.97	50-yr	78.1	245.37	247.74	246.61	247.82	1.27	61.53	33.90	0.30
Reach1	239.97	100-yr	95.3	245.37	247.93	246.75	248.03	1.40	68.16	34.32	0.32
Reach1	239.97	500-yr	170.4	245.37	248.56	247.27	248.75	1.90	90.30	36.95	0.37
Reach1	224.24	2-yr	37.5	245.40	247.07	246.27	247.12	0.96	39.13	32.58	0.28
Reach1	224.24	5-yr	51.7	245.40	247.35	246.42	247.40	1.07	48.41	34.28	0.29
Reach1	224.24	10-yr	59.8	245.40	247.47	246.49	247.54	1.13	52.86	35.10	0.29
Reach1	224.24	25-yr	70	245.40	247.62	246.59	247.69	1.21	57.94	36.09	0.30
Reach1	224.24	50-yr	78.1	245.40	247.72	246.66	247.80	1.26	61.74	36.58	0.31
Reach1	224.24	100-yr	95.3	245.40	247.92	246.79	248.01	1.38	68.91	37.00	0.32
Reach1	224.24	500-yr	170.4	245.40	248.55	247.29	248.72	1.84	92.80	39.67	0.37
Reach1	201.65	2-yr	37.5	245.36	247.04	246.29	247.09	1.01	37.18	31.83	0.30
Reach1	201.65	5-yr	51.7	245.36	247.32	246.44	247.38	1.12	46.27	33.98	0.31
Reach1	201.65	10-yr	59.8	245.36	247.45	246.52	247.52	1.18	50.67	35.12	0.31
Reach1	201.65	25-yr	70	245.36	247.59	246.61	247.67	1.26	55.69	35.73	0.32
Reach1	201.65	50-yr	78.1	245.36	247.69	246.68	247.78	1.31	59.40	35.99	0.33
Reach1	201.65	100-yr	95.3	245.36	247.88	246.82	247.99	1.44	66.38	36.44	0.34
Reach1	201.65	500-yr	170.4	245.36	248.50	247.33	248.69	1.91	89.57	38.16	0.39

Scugog River HEC-RAS Hydraulic Model

Existing Conditions Hydraulic Analysis Summary

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude #
			(m3/s)	(m)	(m)	(m)	(m)	(m/s)	(m2)	(m)	
Reach1	186.86	2-yr	37.5	245.25	247.04	246.23	247.08	0.80	46.60	40.34	0.24
Reach1	186.86	5-yr	51.7	245.25	247.32	246.36	247.36	0.89	58.11	42.16	0.24
Reach1	186.86	10-yr	59.8	245.25	247.45	246.42	247.50	0.94	63.60	42.92	0.25
Reach1	186.86	25-yr	70	245.25	247.60	246.50	247.65	1.00	69.83	43.87	0.25
Reach1	186.86	50-yr	78.1	245.25	247.70	246.56	247.76	1.05	74.47	44.71	0.26
Reach1	186.86	100-yr	95.3	245.25	247.90	246.68	247.96	1.14	83.31	45.29	0.27
Reach1	186.86	500-yr	170.4	245.25	248.54	247.11	248.65	1.51	113.04	48.47	0.31
Reach1	151.09	2-yr	37.5	245.18	247.02	246.06	247.05	0.77	48.96	41.38	0.22
Reach1	151.09	5-yr	51.7	245.18	247.30	246.22	247.34	0.85	60.98	43.93	0.23
Reach1	151.09	10-yr	59.8	245.18	247.43	246.29	247.47	0.90	66.77	45.88	0.23
Reach1	151.09	25-yr	70	245.18	247.58	246.38	247.62	0.96	73.49	47.87	0.24
Reach1	151.09	50-yr	78.1	245.18	247.68	246.44	247.73	1.00	78.56	49.04	0.24
Reach1	151.09	100-yr	95.3	245.18	247.88	246.57	247.94	1.10	88.26	49.93	0.25
Reach1	151.09	500-yr	170.4	245.18	248.51	247.04	248.62	1.46	120.82	52.25	0.29
Reach1	128.2	2-yr	37.5	245.18	246.95	246.26	247.03	1.20	31.30	31.38	0.38
Reach1	128.2	5-yr	51.7	245.18	247.23	246.45	247.31	1.28	40.48	35.06	0.38
Reach1	128.2	10-yr	59.8	245.18	247.36	246.54	247.45	1.33	45.05	37.05	0.38
Reach1	128.2	25-yr	70	245.18	247.50	246.66	247.60	1.39	50.24	37.55	0.38
Reach1	128.2	50-yr	78.1	245.18	247.60	246.74	247.70	1.44	54.07	38.08	0.39
Reach1	128.2	100-yr	95.3	245.18	247.79	246.93	247.91	1.55	61.33	39.47	0.40
Reach1	128.2	500-yr	170.4	245.18	248.38	247.43	248.59	2.00	85.76	42.46	0.44
Reach1	100	2-yr	37.8	245.17	246.92	246.19	246.98	1.07	35.32	33.62	0.33
Reach1	100	5-yr	52.1	245.17	247.20	246.36	247.27	1.15	45.49	39.12	0.34
Reach1	100	10-yr	60.2	245.17	247.33	246.45	247.40	1.19	50.59	41.11	0.34
Reach1	100	25-yr	70.4	245.17	247.47	246.54	247.55	1.25	56.75	49.41	0.35
Reach1	100	50-yr	78.6	245.17	247.57	246.61	247.66	1.29	62.04	52.64	0.35
Reach1	100	100-yr	96	245.17	247.76	246.78	247.86	1.37	72.52	57.12	0.35
Reach1	100	500-yr	171.5	245.17	248.38	247.30	248.52	1.69	114.16	76.34	0.37

E

Appendix E
Stormwater Management

a) Storm Sewer Assessment

CITY OF KAWARTHA LAKES
STORM SEWER DESIGN SHEET
Proposed Condition

Project Name	**Colborne Street**	Project #	B001592	**City of Kawartha Lakes IDF Data**	Storm	**A**	**B**	**C**	City's Criteria:	Manning's n	Calculated By: YY
Design Storm	5-Year	Rainfall Intensity:	$I = A/(B+T)^C$		5-year	**1214**	**9**	**0.847**	V_{min} = 0.75 m/s	0.013 for Concrete	Checked By: MB
Initial Time of Concentration	10 min	T= Time of Concentration in min							V_{max} = 6.00 m/s	0.013 for PVC	

LOCATION				RUNOFF DATA									PIPE DATA										TIME AND USAGE		
From		TO		Catchment ID	Area *A*	Runoff Coeff. *C*	*AC*	Accum. *AC*	Time of Conc. *T*	Rainfall Intensity *I*	Runoff Q_{ac} = *2.78ACI*	External Flow Rate	Nominal Pipe Dia.	Actual Pipe Dia.	Pipe Length	Pipe Type	Manning's *n*	U/S Invert Elev.	D/S Invert Elev.	Fall	Pipe Slope	Flow Velocity V_{full}	Pipe Capacity Q_{full}	Flow Time	Pipe Usage Q_{ac} / Q_{full}	COMMENTS
MH/ CB	Station	MH / CB	Station																						
No.		No.			(ha)				min.	mm/hr	l/sec.	l/sec.	mm	m	m					m	%	m/sec.	l/sec.	min.	%	
Colborne Street West to Scugog River																									
DCBMH1	2+103	CBMH1	2+062	A02	0.07	0.94	0.066	0.066	10.00	100.26	18.3		300	0.300	41.8	PVC	0.013	254.66	254.45	0.21	0.50	0.97	68	0.72	27%	
CBMH1	2+062	Infiltration Gallery		A01	0.10	0.90	0.090	0.156	10.72	97.15	42.1		300	0.300	6.86	PVC	0.013	252.64	252.09	0.55	8.00	3.87	273	0.03	15%	
CBMH2	2+062	Infiltration Gallery		A04	0.15	0.52	0.078	0.078	10.00	100.26	21.7		300	0.300	8.3	PVC	0.013	252.76	252.09	0.66	8.00	3.87	273	0.04	8%	
Infiltration Gallery		CBMH4	2+107					0.234	10.75	97.02	63.1		300	0.300	5.06	PVC	0.013	250.48	250.11	0.38	7.42	3.73	263	0.02	24%	
CBMH3	2+107	CBMH4	2+107	A03	0.03	0.77	0.023	0.023	10.00	100.26	6.4		300	0.300	7.22	PVC	0.013	249.24	249.17	0.07	0.98	1.36	96	0.09	7%	
CBMH4	2+107	OGS #1	2+117	A05	0.06	0.52	0.031	0.288	10.77	96.94	77.6		375	0.375	10.1	PVC	0.013	249.03	248.82	0.21	2.11	2.31	255	0.07	30%	
DCB5	2+126	OGS #1	2+117	A06, 115	0.40	0.50	0.200	0.200	10.00	100.26	55.7		300	0.300	22.3	PVC	0.013	249.19	248.96	0.22	1.00	1.37	97	0.27	58%	
OGS #1	2+117	OUTFALL #1	2+135				0.000	0.488	10.84	96.65	131.2		375	0.375	20.5	PVC	0.013	248.79	247.80	0.99	4.81	3.48	385	0.10	34%	
OUTFALL #1		SCUGOG RIVER																							
Colborne Street East to Scugog River																									
DCB3	2+259	DCBMH3	2+275	A09	0.15	0.91	0.137	0.137	10.00	100.26	38.0		300	0.300	16.6	PVC	0.013	249.57	249.49	0.08	0.50	0.97	68	0.29	56%	
DCBMH3	2+275	DCBMH2	2+265	A10	0.13	0.63	0.082	0.218	10.29	98.98	60.1		300	0.300	19.5	PVC	0.013	249.47	249.37	0.10	0.50	0.97	68	0.34	88%	
DCBMH2	2+265	CBMH6	2+199	A11	0.11	0.89	0.098	0.316	10.63	97.52	85.8		375	0.375	66.3	PVC	0.013	248.77	248.44	0.33	0.50	1.12	124	0.98	69%	
CBMH6	2+199	OGS#2	2+203	A07,A08	0.12	0.95	0.114	0.430	11.61	93.58	112.0		375	0.375	9.6	PVC	0.013	248.29	248.24	0.05	0.50	1.12	124	0.14	90%	
OGS#2	2+203	STMH1						0.430	11.75	93.05	111.3		450	0.450	15.6	PVC	0.013	248.18	248.10	0.08	0.51	1.27	203	0.20	78%	
STMH1	2+191	OUTFALL #2	2+175	A12,A21	0.26	0.71	0.185	0.615	11.95	92.29	157.8		600	0.600	16.8	CONC	0.013	247.95	247.83	0.13	0.75	1.88	532	0.15	30%	
OUTFALL #2		SCUGOG RIVER																							
William Street North, From North to South																									
CBMH8	1+962	CBMH9	1+962	A13	0.13	0.47	0.061	0.061	10.00	100.26	17.0		300	0.300	76.8	PVC	0.013	261.01	259.08	1.93	2.51	2.17	153	0.59	11%	
CBMH9	1+962	MH10	1+975	A14	0.58	0.46	0.267	0.328	10.59	97.69	89.1		300	0.300	13.1	PVC	0.013	258.94	257.89	1.05	8.02	3.87	274	0.06	33%	
REGENT ST		MH10	1+975	A16	0.07	0.58	0.041	0.041	10.00	100.26	11.3		300	0.300	12.6	PVC	0.013				4.70	2.97	210	0.07	5%	
EXMH30		MH10	1+975	A15	3.06	0.43	1.316	1.316	12.00	92.11	336.9		525	0.525	15.6	PVC	0.013				1.20	2.18	471	0.12	72%	
MH10	1+975	CBMH10	2+038					1.684	12.12	91.66	429.2		600	0.600	62.8	CONC	0.013	257.54	256.91	0.63	1.00	2.18	615	0.48	70%	
CBMH10	2+038	CBMH11	2+105	A17	0.36	0.64	0.230	1.915	12.60	89.94	478.7		600	0.600	67.6	CONC	0.013	256.88	255.81	1.07	1.58	2.73	772	0.41	62%	
CBMH11	2+105	EXMH33	2+121	A18	0.41	0.68	0.279	2.194	13.01	88.52	539.8		600	0.600	16.0	CONC	0.013	255.76	255.55	0.21	1.31	2.49	703	0.11	77%	
EXCBMH 3		EXMH 33		A20	0.19	0.84	0.160	0.160	10	100.26	44.5		1050	1.050	16.0	CONC	0.013				0.50	2.23	1,931	0.12	2%	Assumed slope
EXMH33		STMMH (William St.)		A19	0.21	0.88	0.185	2.538	13.12	88.14	621.9		675	0.675	51.4	CONC	0.013				1.00	2.35	841	0.36	74%	Assumed slope, Needs to be verified.

b) Bridge Spread Analysis

INLET SPACING, SPREAD FLOW DEPTH CALCULATIONS - Colborne Brigde

ULTIMATE CONDITIONS: 2 Lanes

Shoulder width = 1.00 m and 3.50 m and 3.50 m for road section

HWY. NO.	Colborne Street			RAINFALL STATION(S)	City of Kawartha Lakes
W.P NO.	B001592	DATE	Feb 2026	DESIGN SPREAD	
DESIGNED BY	YY	DATE	Feb 2026	CURB & GUTTER TYPE	Curb and Gutter OPSD 600.01
CHECKED BY	MB			INLET TYPE	

	LOCATION		DRAINAGE AREA DETAILS								FLOW, SPREAD AND INLET SPACING													
Design Frequency	From Inlet Station	To Inlet Station	Gutter Grade S_o	Gutter Crossfall S_w	Road Crossfall S_x	Average Width W	Watershed Area A	Runoff Coeff. C	Time of Conc. T_c	Rainfall Intensity I	Local Runoff Q_r	Gutter Flow Q_g	Inlet Spacing L	**Flow Spread T**	Flow Depth at Shoulder d_s	Flow Area A_F	Flow Velocity V	Flow Travel Time t	Spread Encroachment at the Lane	Flow Depth at EOP (d_l)	Inlet Capacity Q_i	Carryover Flow Q_c	Location of Deck Drain	Remarks
			m/m	m/m	m/m	m	ha		min	mm/h	m^3/s	m^3/s	m	**m**	mm	m^2	m/s	min	m	mm	m^3/s	m^3/s		
1	2	3	4	5	6	7	8	9	10	11	13	12	14	**15**	16	17	18	19	20	21	22	23	24	25
5-yr (Minor system Event)	**Colborne Bridge**																							
														Shoulder Width =		**1.00**								Same flow from other half of the Road
	02+100.0	02+120.0	0.02950	0.020	0.020	7.250	0.0145	0.95	5.00	129.9	0.005	0.005	20.00	**0.87**	17.4	0.0075	0.66	0.50	0.00	0.0		0.0050		
	02+120.0	02+140.0	0.03900	0.020	0.020	7.250	0.0145	0.95	5.50	126.0	0.005	0.010	20.00	**1.06**	21.3	0.0113	0.87	0.38	0.06	1.3		0.0099		
	02+140.0	02+160.0	0.04350	0.020	0.020	7.250	0.0145	0.95	5.88	123.3	0.005	0.015	20.00	**1.21**	24.1	0.0146	1.00	0.33	0.21	4.1		0.0146		
	02+160.0	02+180.0	0.03350	0.020	0.020	7.250	0.0145	0.95	6.21	121.0	0.005	0.019	20.00	**1.41**	28.1	0.0198	0.98	0.34	0.41	8.1		0.0193		
	02+180.0	02+200.0	0.05350	0.020	0.020	7.250	0.0145	0.95	6.56	118.8	0.005	0.024	20.00	**1.39**	27.9	0.0195	1.23	0.27	0.39	7.9		0.0239		
100-year (Major System Event)	**Colborne Bridge**																							
	02+100.0	02+120.0	0.02950	0.020	0.020	7.250	0.0145	0.95	5.00	194.8	0.008	0.008	20.00	**1.01**	20.2	0.0102	0.74	0.45	0.01	0.2	0.0000	0.0075		
	02+120.0	02+140.0	0.03900	0.020	0.020	7.250	0.0145	0.95	5.50	190.2	0.007	0.015	20.00	**1.24**	24.8	0.0153	0.97	0.34	0.24	4.8	0.0000	0.0149		
	02+140.0	02+160.0	0.04350	0.020	0.020	7.250	0.0145	0.95	5.88	186.9	0.007	0.022	20.00	**1.41**	28.2	0.0198	1.11	0.30	0.41	8.2	0.0000	0.0221		
	02+160.0	02+180.0	0.03350	0.020	0.020	7.250	0.0145	0.95	6.21	184.0	0.007	0.029	20.00	**1.64**	32.8	0.0269	1.08	0.31	0.64	12.8	0.0000	0.0292		
	02+180.0	02+200.0	0.05350	0.020	0.020	7.250	0.0145	0.95	6.56	181.2	0.007	0.036	20.00	**1.63**	32.6	0.0266	1.36	0.24	0.63	12.6	0.0000	0.0361		
							0.073	**ha**																

Rainfall Parameters

a) Rainfall parameters are based on intensity-duration-frequency curves from City of Kawartha Lakes Infrastructure Guidelines

5-Year Storm:	A =	1214.000	Rainfall Intensity: I = A/(B+T)C	**100-Year Storm:** A =	2518.000
	B =	9.000	Where, I in mm/hr	B =	13.200
	C =	0.8470	T = Time of Concentration in hour	C =	0.882

Note: EOP = Edge of pavement of the travelled lane

Note

All the figures in blue colour need to be updated by the user for respective project.

Local Runoff $(Q_r) = 0.0028\,CIA$ (m^3/s)

Where, C = Runoff coefficient
A = Watershed area (ha)
I = Rainfall Intensity (mm/hr)

Time of Concentration by Bransby Williams Method.

$$T_c = 0.057 \times L / \left(S_0^{0.20} \times A^{0.10}\right)$$

Where, T_c = Time of concentration (min)
L = Watershed length = Inlet Spacing (m)
S_0 = Watershed Slope (%)
A = Watershed Area (ha)

Spread, $(T) = \dfrac{(1/S_x) \times (Q_g)^{3/8}}{(0.375)^{0.375} \times (1/S_x)^{3/8} \times (1/n)^{3/8} \times S_0^{3/16}}$ (m)

c) OGS Sizing Report

Stormceptor®

OGS #1

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

04/23/2025

Province:	Ontario
City:	Kawartha Lakes
Nearest Rainfall Station:	PETERBOROUGH
Climate Station Id:	6166456
Years of Rainfall Data:	15
Site Name:	
Drainage Area (ha):	0.82
% Imperviousness:	54.00

Runoff Coefficient 'c': 0.62

Project Name:	Colborne Street
Project Number:	B001592
Designer Name:	YUAN YUAN
Designer Company:	Cima+
Designer Email:	yuan.yuan@cima.ca
Designer Phone:	226-206-0083
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	18.47
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	364
Estimated Average Annual Sediment Volume (L/yr):	296

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	54
EFO5	58
EFO6	61
EFO8	65
EFO10	67

Recommended Stormceptor EFO Model: EFO6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 61

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

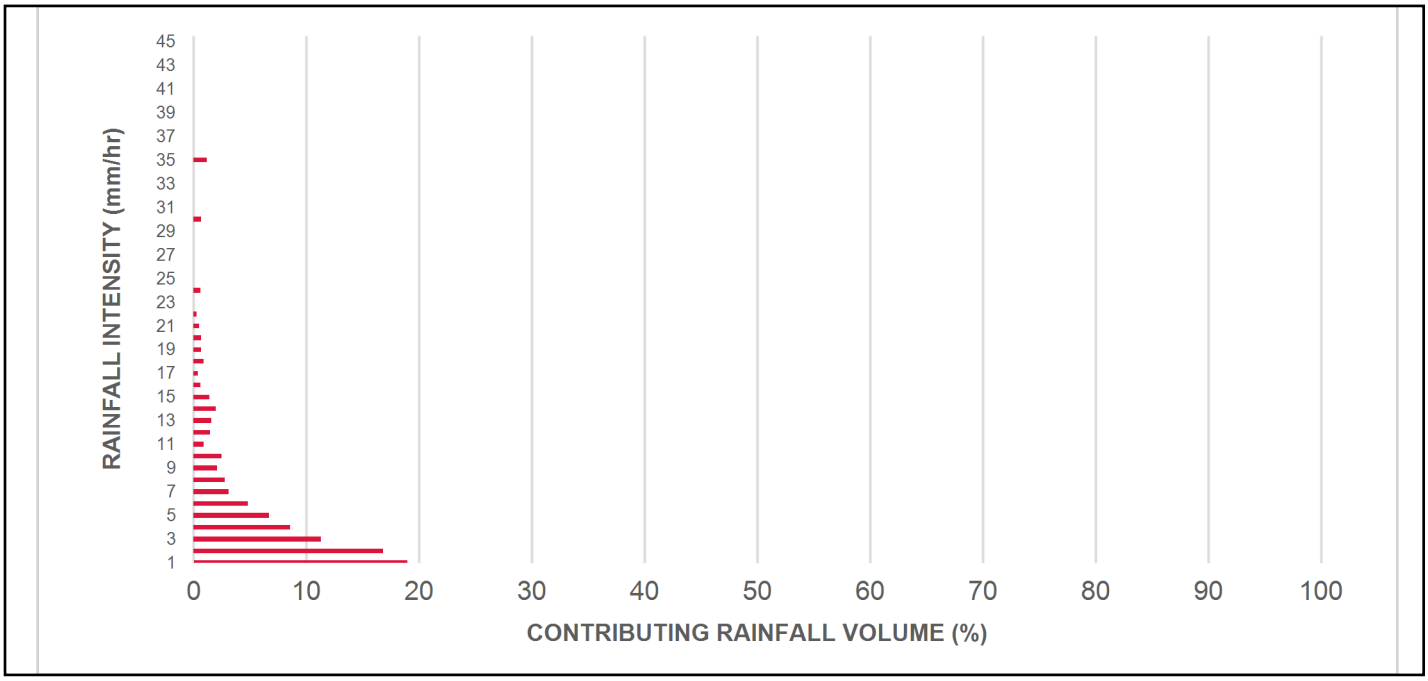
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

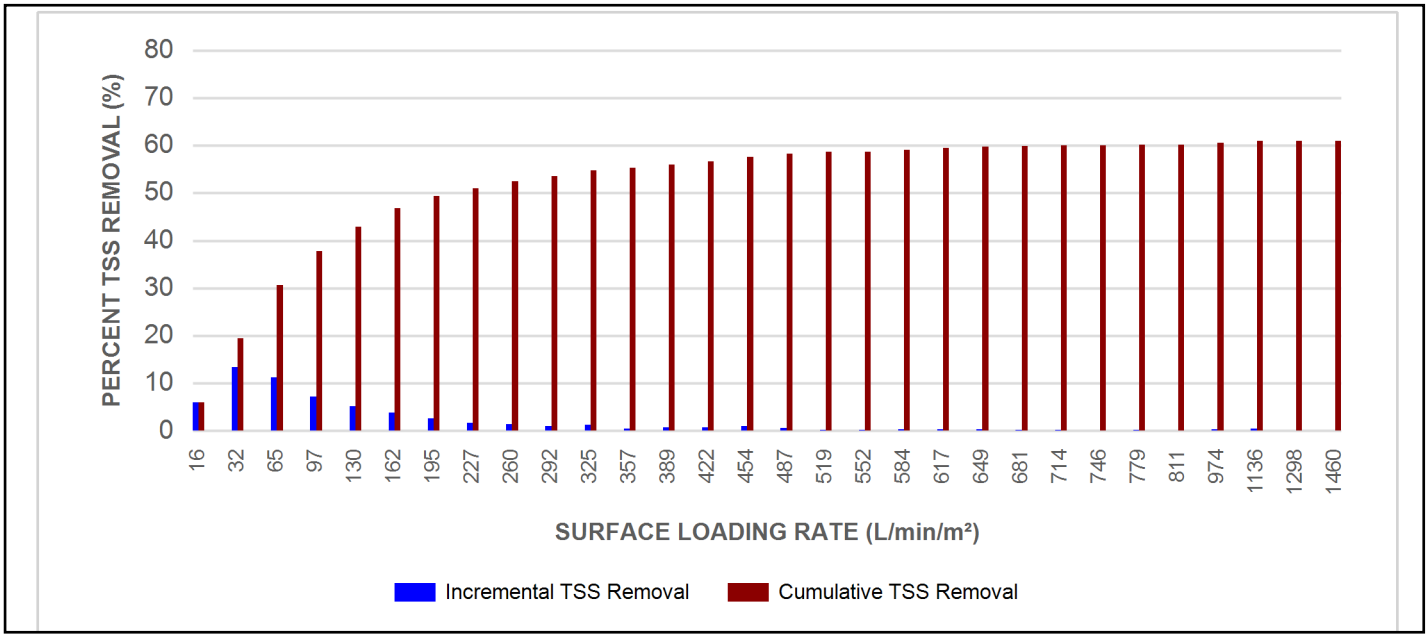
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	0.71	43.0	16.0	70	6.0	6.0
1.00	19.0	27.5	1.42	85.0	32.0	70	13.4	19.4
2.00	16.8	44.3	2.84	171.0	65.0	67	11.3	30.7
3.00	11.3	55.6	4.27	256.0	97.0	63	7.1	37.8
4.00	8.6	64.2	5.69	341.0	130.0	60	5.1	42.9
5.00	6.7	70.9	7.11	427.0	162.0	57	3.8	46.8
6.00	4.8	75.6	8.53	512.0	195.0	55	2.6	49.4
7.00	3.1	78.7	9.96	597.0	227.0	53	1.6	51.0
8.00	2.8	81.5	11.38	683.0	260.0	52	1.5	52.5
9.00	2.1	83.6	12.80	768.0	292.0	51	1.1	53.5
10.00	2.5	86.1	14.22	853.0	325.0	50	1.3	54.8
11.00	0.9	87.0	15.65	939.0	357.0	50	0.5	55.3
12.00	1.5	88.5	17.07	1024.0	389.0	48	0.7	56.0
13.00	1.6	90.0	18.49	1110.0	422.0	47	0.7	56.7
14.00	2.0	92.0	19.91	1195.0	454.0	47	0.9	57.6
15.00	1.4	93.5	21.34	1280.0	487.0	46	0.7	58.3
16.00	0.6	94.1	22.76	1366.0	519.0	44	0.3	58.6
17.00	0.4	94.5	24.18	1451.0	552.0	44	0.2	58.7
18.00	0.9	95.3	25.60	1536.0	584.0	43	0.4	59.1
19.00	0.7	96.0	27.03	1622.0	617.0	42	0.3	59.4
20.00	0.7	96.7	28.45	1707.0	649.0	42	0.3	59.7
21.00	0.5	97.2	29.87	1792.0	681.0	42	0.2	59.9
22.00	0.3	97.5	31.29	1878.0	714.0	41	0.1	60.0
23.00	0.0	97.5	32.72	1963.0	746.0	41	0.0	60.0
24.00	0.6	98.1	34.14	2048.0	779.0	41	0.2	60.2
25.00	0.0	98.1	35.56	2134.0	811.0	41	0.0	60.2
30.00	0.7	98.8	42.67	2560.0	974.0	40	0.3	60.5
35.00	1.2	100.0	49.79	2987.0	1136.0	38	0.5	61.0
40.00	0.0	100.0	56.90	3414.0	1298.0	36	0.0	61.0
45.00	0.0	100.0	64.01	3841.0	1460.0	33	0.0	61.0
Estimated Net Annual Sediment (TSS) Load Reduction =								**61 %**

Climate Station ID: 6166456 *Years of Rainfall Data*: 15

RAINFALL DATA FROM PETERBOROUGH RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



imbrium

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

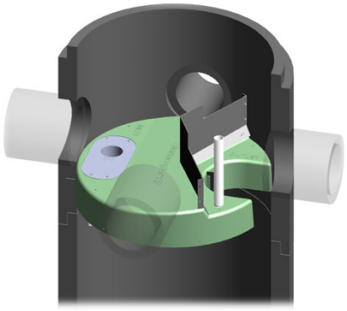
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

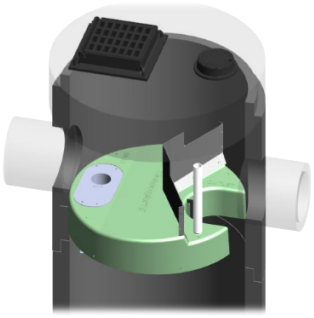
DESIGN FLEXIBILITY

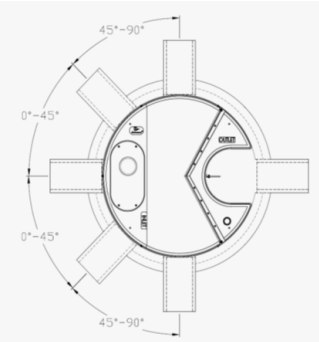
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

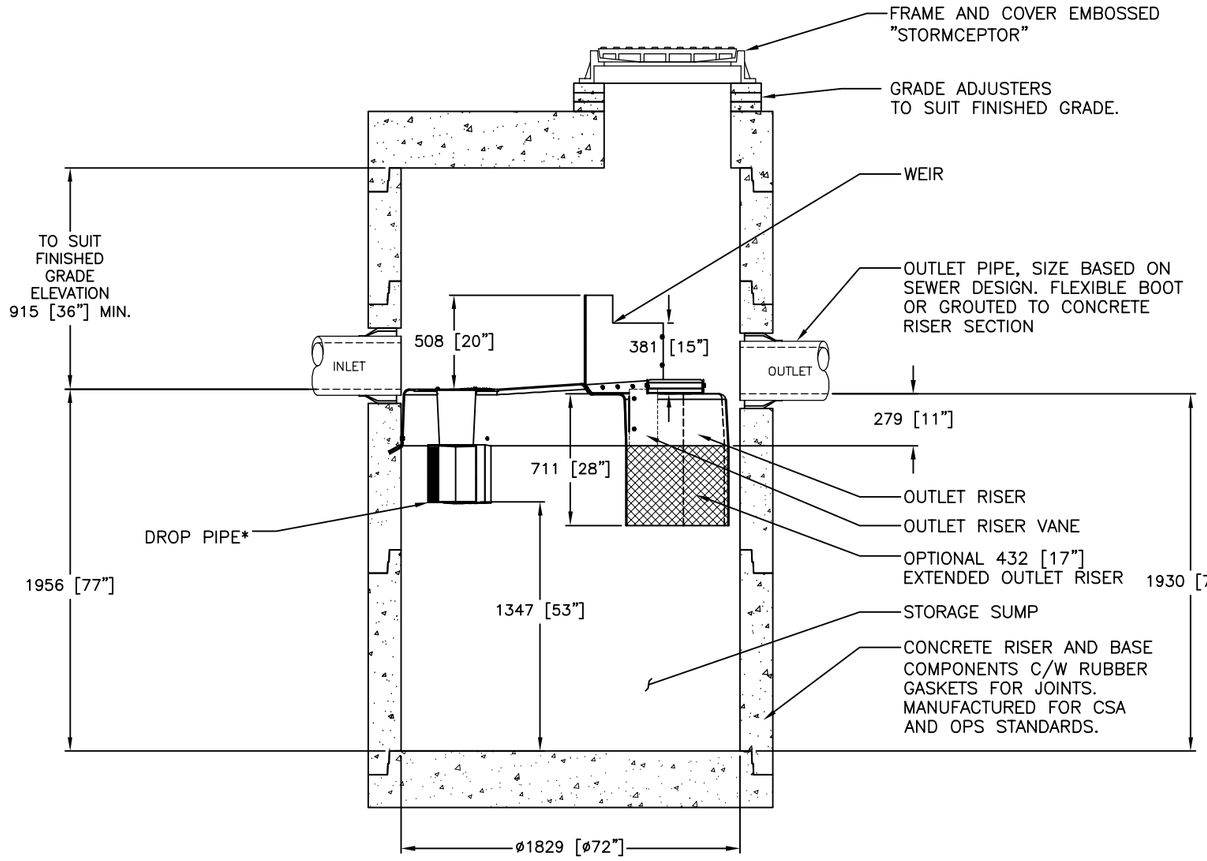
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-

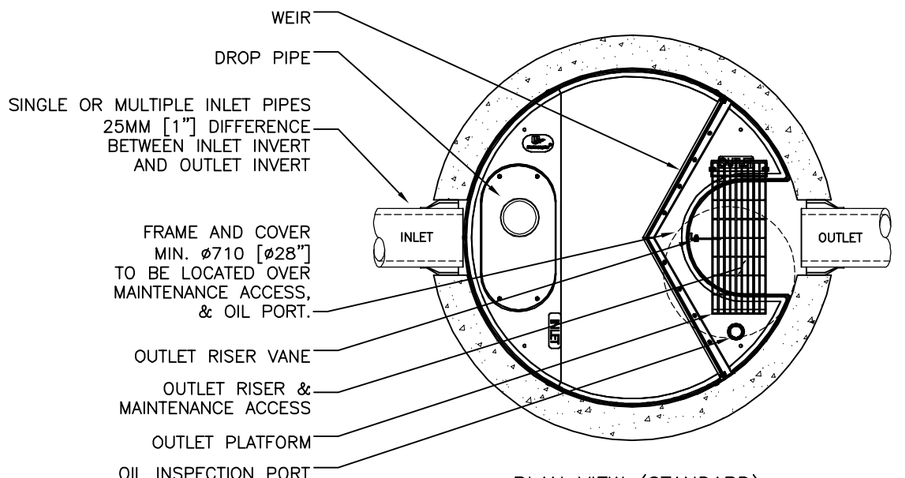
entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

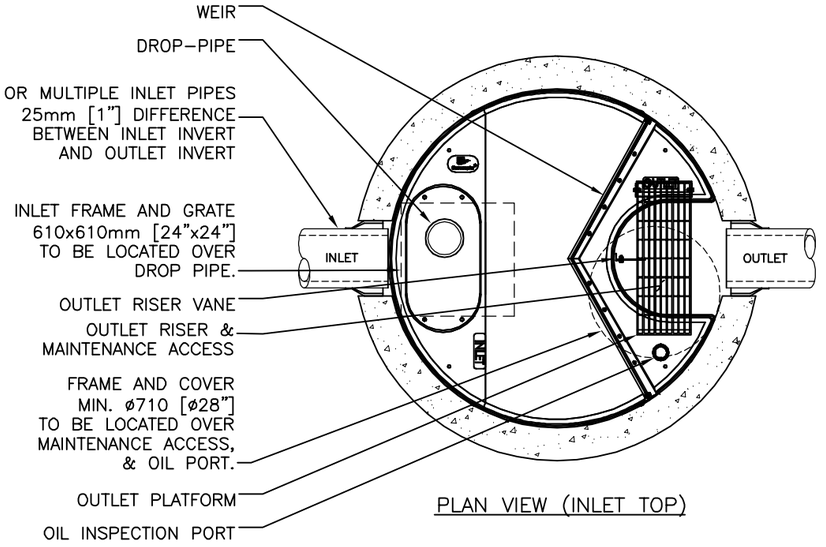
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

- * MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF6 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO6 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO6				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

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MARK	DATE	REVISION DESCRIPTION	BY
####	####	####	####
####	####	####	####
####	####	####	####
1	6/8/18	OUTLET PLATFORM	JSK
0	05/26/17	INITIAL RELEASE	JSK

SCALE = NTS

Stormceptor® EF

imbrium®

407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9
TF 800-565-4801 CA 416-960-9900 INTL +1-416-960-9900

THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS

DATE: 10/13/2017	
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: SP
PROJECT No.: EFO6	SEQUENCE No.: *
SHEET: 1 OF 1	

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OGS #2

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

05/22/2025

Province:	Ontario
City:	Kawartha Lakes
Nearest Rainfall Station:	PETERBOROUGH
Climate Station Id:	6166456
Years of Rainfall Data:	15
Site Name:	
Drainage Area (ha):	0.51
% Imperviousness:	86.00

Runoff Coefficient 'c': 0.81

Project Name:	Colborne Street
Project Number:	B001592
Designer Name:	YUAN YUAN
Designer Company:	Cima+
Designer Email:	yuan.yuan@cima.ca
Designer Phone:	226-206-0083
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	15.02
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	355
Estimated Average Annual Sediment Volume (L/yr):	288

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	56
EFO5	60
EFO6	62
EFO8	66
EFO10	68

Recommended Stormceptor EFO Model: EFO5

Estimated Net Annual Sediment (TSS) Load Reduction (%): 60

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

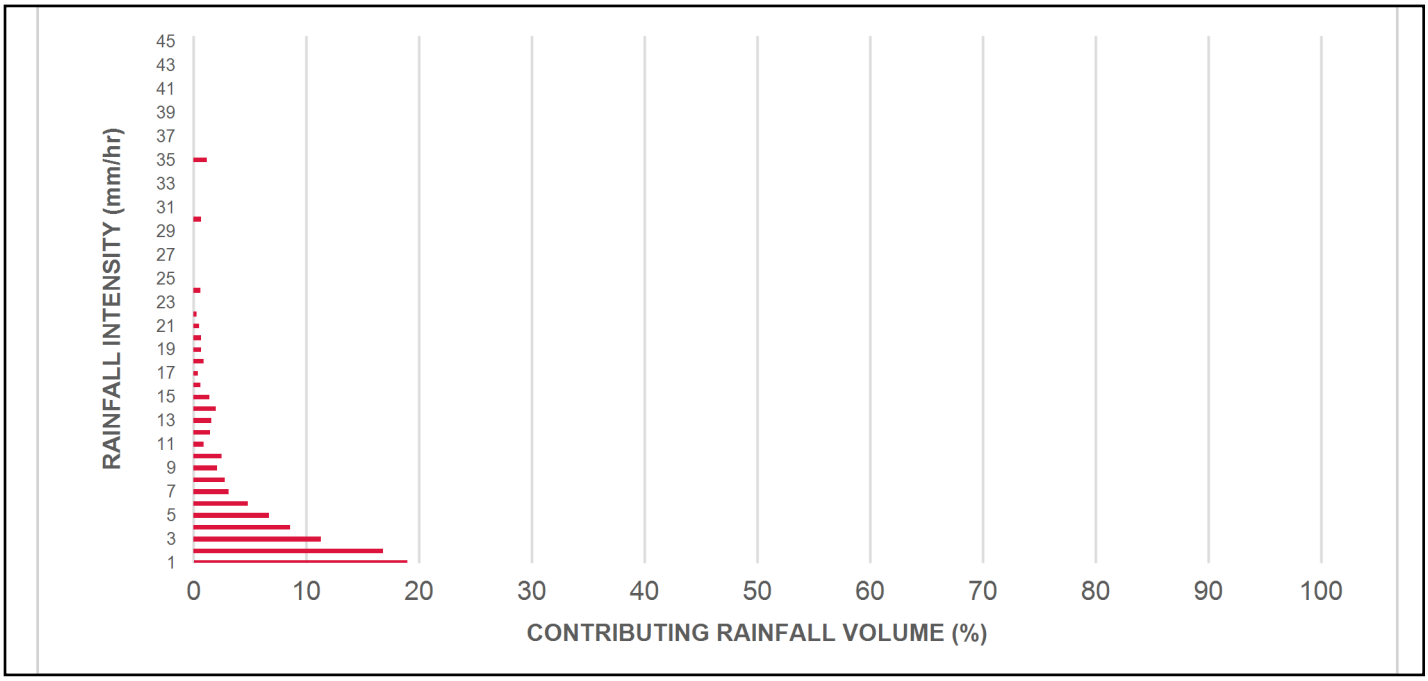
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

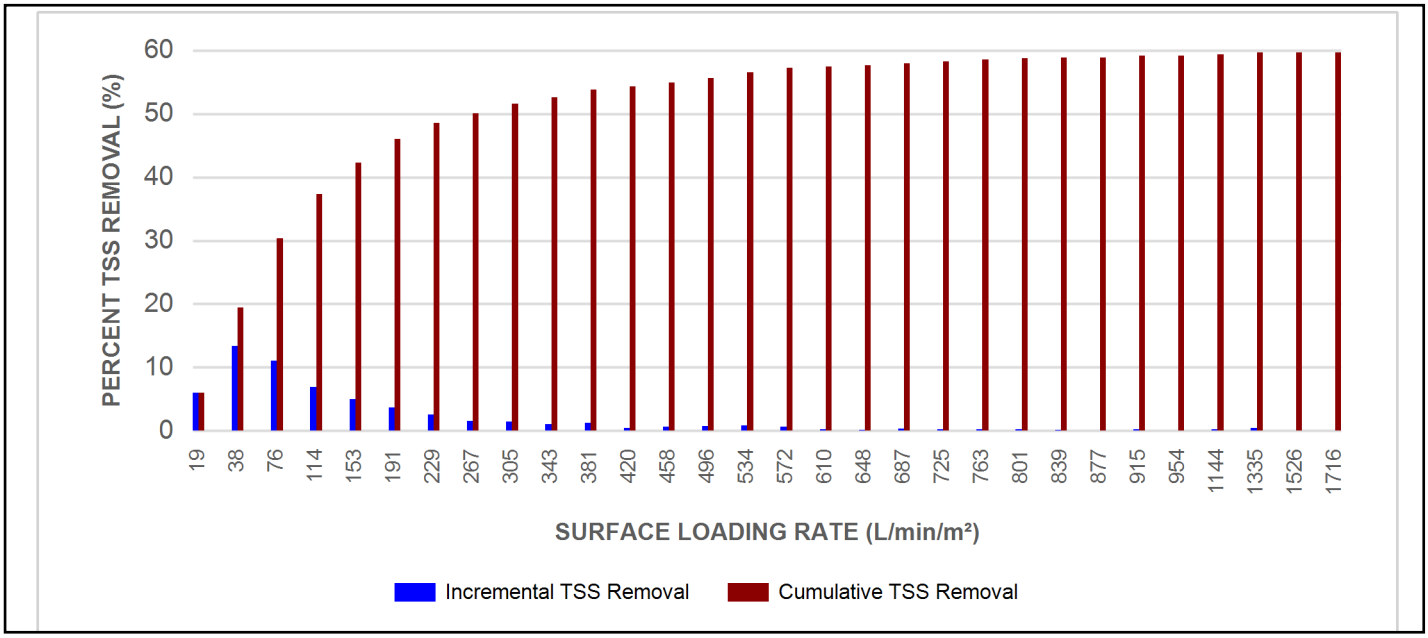
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	0.58	35.0	19.0	70	6.0	6.0
1.00	19.0	27.5	1.16	69.0	38.0	70	13.4	19.4
2.00	16.8	44.3	2.31	139.0	76.0	66	11.0	30.4
3.00	11.3	55.6	3.47	208.0	114.0	62	6.9	37.3
4.00	8.6	64.2	4.63	278.0	153.0	58	5.0	42.3
5.00	6.7	70.9	5.78	347.0	191.0	55	3.7	46.0
6.00	4.8	75.6	6.94	416.0	229.0	53	2.5	48.5
7.00	3.1	78.7	8.10	486.0	267.0	52	1.6	50.1
8.00	2.8	81.5	9.26	555.0	305.0	51	1.4	51.6
9.00	2.1	83.6	10.41	625.0	343.0	50	1.0	52.6
10.00	2.5	86.1	11.57	694.0	381.0	49	1.2	53.8
11.00	0.9	87.0	12.73	764.0	420.0	47	0.4	54.3
12.00	1.5	88.5	13.88	833.0	458.0	47	0.7	54.9
13.00	1.6	90.0	15.04	902.0	496.0	45	0.7	55.6
14.00	2.0	92.0	16.20	972.0	534.0	44	0.9	56.5
15.00	1.4	93.5	17.35	1041.0	572.0	43	0.6	57.2
16.00	0.6	94.1	18.51	1111.0	610.0	42	0.2	57.4
17.00	0.4	94.5	19.67	1180.0	648.0	42	0.2	57.6
18.00	0.9	95.3	20.82	1249.0	687.0	42	0.4	57.9
19.00	0.7	96.0	21.98	1319.0	725.0	41	0.3	58.2
20.00	0.7	96.7	23.14	1388.0	763.0	41	0.3	58.5
21.00	0.5	97.2	24.30	1458.0	801.0	41	0.2	58.7
22.00	0.3	97.5	25.45	1527.0	839.0	41	0.1	58.8
23.00	0.0	97.5	26.61	1597.0	877.0	41	0.0	58.8
24.00	0.6	98.1	27.77	1666.0	915.0	40	0.2	59.1
25.00	0.0	98.1	28.92	1735.0	954.0	40	0.0	59.1
30.00	0.7	98.8	34.71	2082.0	1144.0	38	0.3	59.3
35.00	1.2	100.0	40.49	2430.0	1335.0	35	0.4	59.7
40.00	0.0	100.0	46.28	2777.0	1526.0	31	0.0	59.7
45.00	0.0	100.0	52.06	3124.0	1716.0	28	0.0	59.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**60 %**

Climate Station ID: 6166456 *Years of Rainfall Data*: 15

RAINFALL DATA FROM PETERBOROUGH RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

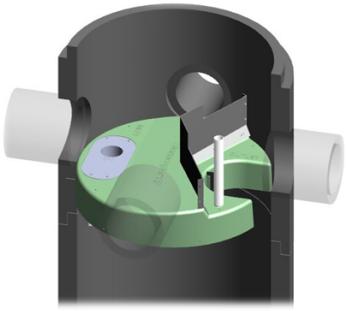
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

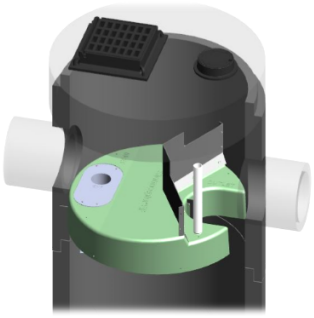
DESIGN FLEXIBILITY

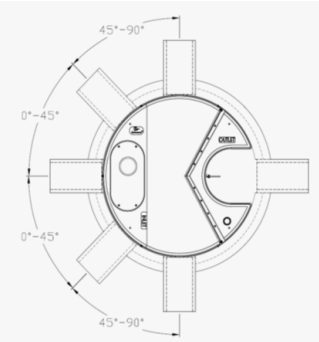
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

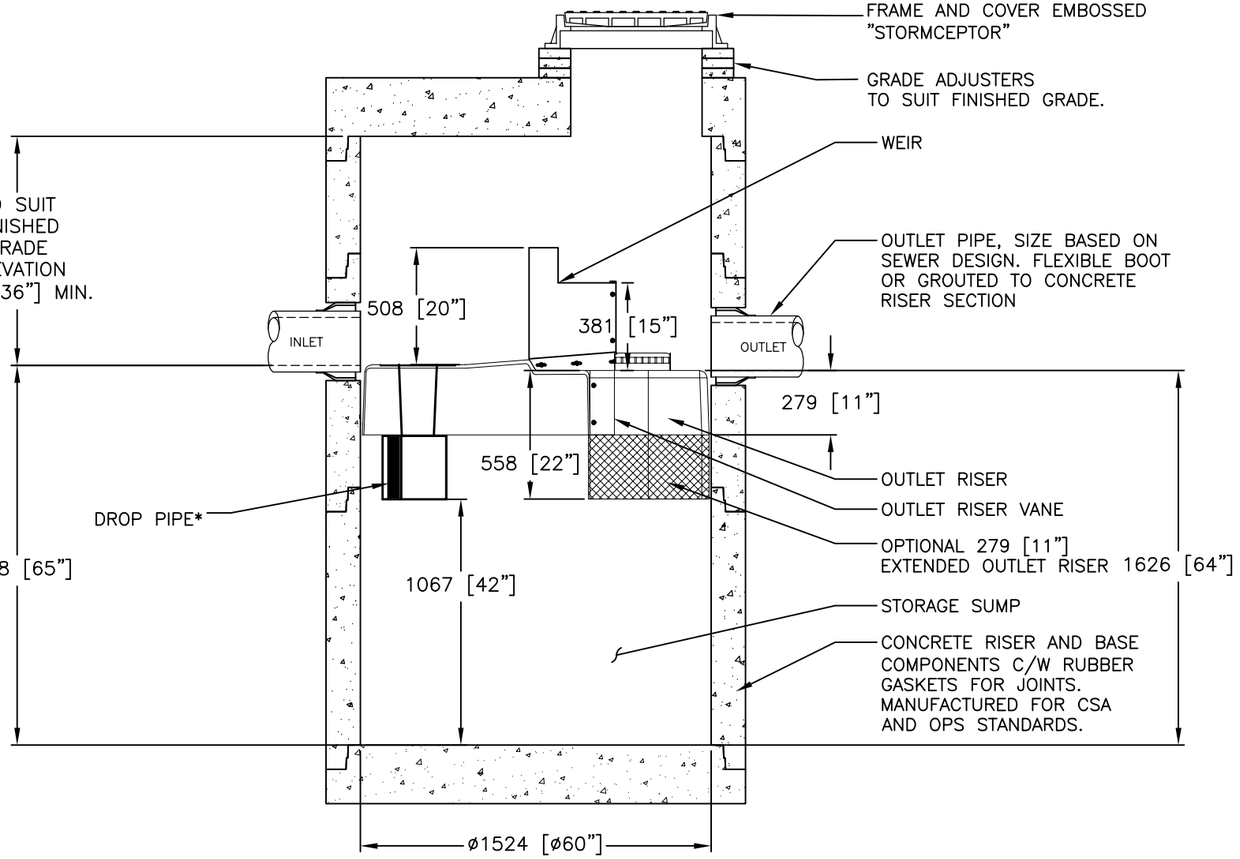
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-

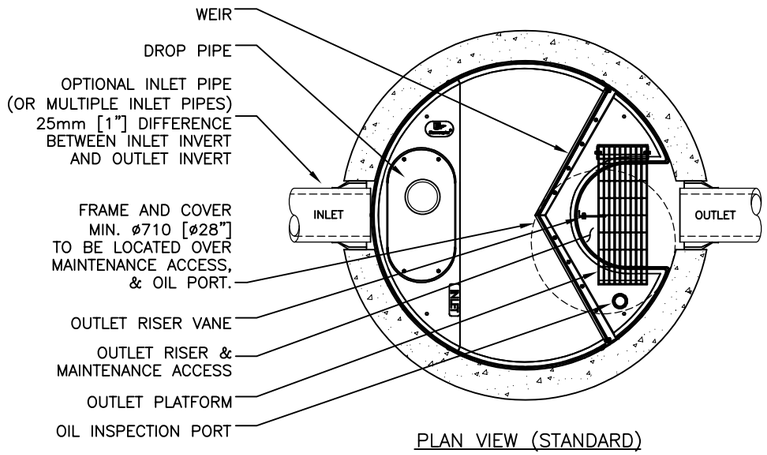
entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

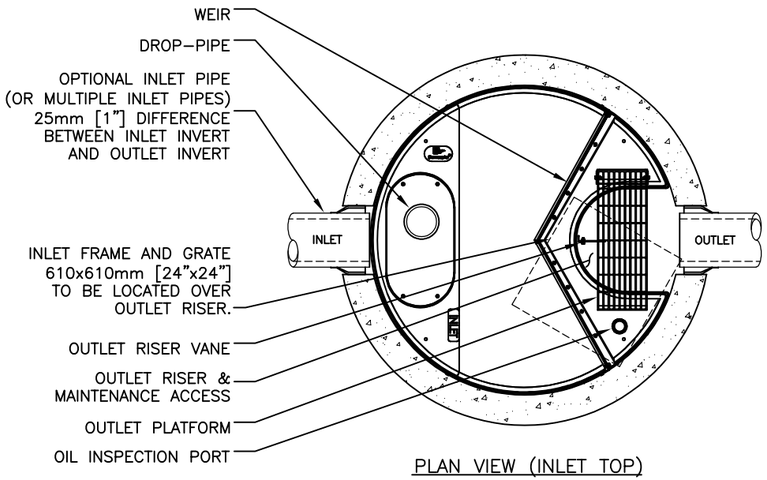
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF5 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO5 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO5
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

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MARK	DATE	REVISION DESCRIPTION	BY
0	08/22/24	INITIAL RELEASE	EC
#####	#####	#####	#####
#####	#####	#####	#####
#####	#####	#####	#####
#####	#####	#####	#####

Stormceptor® EF

SCALE = NTS

imbrium®

407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9
TF 800-565-4801 CA 416-960-9900 INTL +1-416-960-9900

THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS
Australia Patent No. 693,164 • 707,133 • 729,096 • 779401 | Austrian Patent No. 289,647
| Canadian Patent No. 2,009,280 • 2,137,942 • 2,175,277 • 2,180,305 • 2,180,383 • 2,206,338 • 2,327,768
| China Patent No. 1,168,439 | Denmark DK 711,879 | German DE 69,534,021 | Indonesian Patent No 16,688
| Japan Patent No. 9-11476 (Pending) | Korea Patent No. 10-2000-0026101 (Pending)
| Malaysia Patent No. PI9701737 (Pending) | New Zealand Patent No. 314646
| United States Patent No. 4,985,148 • 5,498,331 • 5,725,760; 5,753,115 • 5,849,181 • 6,068,765 • 6,371,690

DATE: 8/22/2024	
DESIGNED: JSK	DRAWN: EC
CHECKED: BSF	APPROVED:
PROJECT No.: EFO5	SEQUENCE No.: *
SHEET: 1 OF 1	

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d) Infiltration Gallery Sizing

Project Name: **Kawartha Lakes_Colborne Street Detailed Design**
Project # B001562

Infiltration Gallery Design

Parameters and Input Data				
Parameters	**Unit**	**Symbol**	**Data**	**Remark**
Drainage Area	ha	A_d	1.37	
Retention Requirement	mm	R	5	
Void Ratio		n	0.40	
Infiltration Rate	mm/hr	P	10	
Drawdown Time	hr	T	Minimum 24 hr, Maximum 48 hr	
Depth of Gallery	m	d		
Retention Volume	m^3	V		
Gallery Surface Area	m^2	A_g		

A) Gallery Volume Calculation

Require Retention Volume	V =	10RA	m^3	Where, A in Ha, R in mm
	=	68.425	m^3	
Gross Gallery Volume	V_g =	V/n		
	=	171.0625	m^3	

B) Calculation of Allowable Depth and Surface Area

Per MECP SWM Planning and Design manual, Equation 4.2:

Allowable depth =	d_a =	PT/1000	m	Where , P in mm/hr
	Minimum Depth =	0.24	m	For 24 hour Drawdown Time
	Mixoimum Depth =	0.48	m	For 48 hour Drawdown Time
Required Gallery Surface Area =	A_g =	$V/(nd_a)$	m^2	
	=	712.8	m^2	For minimum Depth
	=	356.4	m^2	For Maximum Depth

C) Gallery Size Estimate

Gallery #	L (m)	W (m)	d (m)	Location
Gallery 1	20	1.50	0.45	
Gallery 2	20	1.50	0.45	

D) Volume and Drawdown Check

Gallery #	Surface Area	Retention Volume	Drawdown Time Actual	Drawdown Time Check	Equation
	m^2	m^3	Hr	48Hr>T>24hr	
Gallery 1	30	5	45.0	OK	A = (L x W) m^2
Gallery 2	30	5	45.0	OK	
					T = [1000 x V / (P x n x A)] hr
Total	**60**	**11**	**45.0**	OK	

SUBMITTED BY CIMA CANADA INC.
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Burlington, ON. L7N 3G7
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cima.ca

The Corporation of the City of Kawartha Lakes

Phase One Environmental Site Assessment

Detailed Design of the Colborne Street Bridge

Colborne Street, Lindsay, Ontario

B001592

CIMA+ file number: B001592
September 15, 2023

The Corporation of the City of Kawartha Lakes

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Prepared by:

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Senior Hydrogeologist

Verified by:

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CIMA+ file number: B001592
September 15, 2023

1. Executive Summary

Executive Summary (Phase One ESA)

Phase One Environmental Site Assessment (ESA)

Site identification:	Colborne Street Bridge, Lindsay, Ontario
Location:	Scugog River crossing located within the Colborne Street right-of-way
Activity:	Phase One ESA as part of Environmental Assessment and Detailed Impact Assessment Integration to support the detailed design of the Colborne Street Bridge.
Inspector Name:	Lake Johnston, Environmental Professional
Qualified Person:	Karen Greer, M.Sc., P.Geo., Senior Hydrogeologist
Client Contact:	Corby Purdy, Manager, Infrastructure Design and Construction

Findings and Recommendations Summary

Potential Source of Impacts	PCA	Comments	Recommended Intervention
Historic Land Use	Yes	The Site currently consists of the river crossing, a municipal park located at 99 Lindsay Street North, a retirement home located 140 William Street, residences, and a portion of Colborne Street and Lindsay Street. Historically, a gas station was formerly present on the Site, along with a sawmill, lumber storage, railroad spurs, associated manufacturing, and a former waste disposal area.	Phase Two ESA to support Site redevelopment or change to more sensitive land use, as required.
Adjoining Properties	Yes	East Residential properties; South Scugog River, residences, and retail properties ; West Single-family residences; and North Scugog River, Rivera Park, and residences.	
Fill	No	No evidence of fill associated with historical activities was observed within the Study Area; however, the use of imported fill associated with roadway construction and housing development is inferred.	N/A
Drains and Wells	No	No drains or wells observed.	N/A
Sanitary Conditions	No	No signs of unsanitary conditions were observed.	N/A
Exterior Surfaces and Stressed Vegetation	No	On-Site surfaces consist of a mix of asphalt, concrete, rock, grassed and landscaped areas. No stressed vegetation was observed during the Site visit.	N/A
Storage Tank	No	No storage tanks were observed at the Site.	N/A
Infrastructure	No	The Site is serviced by municipal water and sewer by the City of Kawartha Lakes.	N/A
Operation at the Property	No	A mix of residential, commercial, and green space areas are within the Study Area. Ongoing salting activities for public health and safety.	N/A
Hazardous Material	No	No hazardous material were noted within the Study Area.	N/A

Executive Summary (Phase One ESA)

Products manufactured at the property, By-product and Waste Management	No	Municipal waste is collected by the City of Kawartha Lakes.	N/A
Location and Contents of Drums, Totes and Bins	No	No drums, totes or bins were observed during the Site visit.	N/A
Equipment Maintenance Areas	No	No equipment maintenance areas were observed.	N/A
Spills and Stains	No	No staining was observed during the Site visit.	N/A

Conclusions and Recommendations

The Phase One ESA was completed for the proposed location of a Scugog River crossing located within the Colborne Street right-of-way, in the City of Kawartha Lakes. Based on the results of the Phase One ESA, PCA were noted both on-Site (historic land uses) and off-Site (historic presence of Lindsay Hydro location and possible coal tar contamination). As a result, three (3) APEC (denoted A, B, and C) were identified for the Site. A Phase Two ESA is therefore recommended to investigate the identified APECs for the listed COPC prior to Site redevelopment or change to a more sensitive land use as required.

Glossary:
Site: Phase I Property
Study Area: Phase I Study Area (250 m)
ESA: Environmental Site Assessment
PCA: Potential Contaminating Activity
APEC: Areas of Potential Environmental Concerns

Note: This summary is part of a detailed report containing elements of information essential to its proper interpretation. Conclusions and recommendations might be revised based on information requested from public sources not yet obtained. If amendments seem necessary, CIMA+ will forward this information upon reception.

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1. Introduction

CIMA Canada Inc. (CIMA+) was retained by The Corporation of the City of Kawartha Lakes (the "City") to complete a Phase One Environmental Site Assessment (ESA) as part of detailed design of the Colborne Street Bridge, herein referred to as the "Phase One Property" or "Site", located in Lindsay, Ontario (**Figure 1**, **Appendix A**).

1.1 Scope of Investigation

The scope of this Phase One ESA was developed in general accordance with Ontario Regulation 153/04 (Records of Site Condition – Part XV.1 of the Act), as amended (O. Reg. 153/04). The work was done under the supervision of a Qualified Person (QP) as defined in O. Reg 153/04. Tasks completed as part of the scope of investigation include but are not limited to:

+ Obtaining and reviewing sources of information pertaining to the Site and key properties within the Study Area, as required (i.e aerial photographs, historical reports, and fire insurance plans);
+ Inspection of the Site for evidence of current or past Potentially Contaminating Activities (PCA) that could contribute to Areas of Potential Environmental Concern (APEC);
+ Completion of a "windshield-level" assessment/Site visit from roadways and publicly accessible areas within the Phase One Study Area;
+ Interviewing owners, tenants and/or neighbours of the Site, where possible;
+ Identifying PCA in the Study Area that could contribute to APEC on the Site;
+ Preparation of a report including a summary of relevant documentation, detailing investigation findings as well as conclusions and recommendations inclusive of:
    - Identification of on and off-Site PCA(s)
    - Identification of APEC(s) on the Site
    - Assessment of Contaminants of Potential Concern (COPC) or of known Contaminants of Concern (COC)
    - Recommendation for a Phase Two ESA, if applicable.

The purpose of the Phase One ESA is to determine if evidence of actual and/or potential contamination exists at, or adjacent to, the Site. The Phase One ESA works to identify PCA that could contribute to APEC on the Phase One Property. A Phase One ESA does not include the surface and subsurface testing of media (soil, sediment and/or groundwater) for COPC or known COC and therefore the conclusions of the report are limited to the identification of the PCA that may contribute to APEC on the Site. The investigation of the APEC, if required based on the conclusions of the Phase One ESA are done by way of a recommendation to complete a Phase Two ESA. A Phase Two ESA works to gather qualitative and quantitative information to confirm or refute APEC on the Site.

This report must be read and interpreted in accordance with the limitations and constraints outlined in **Section 5.1**.

1.2 General Description of the Phase One Property

The Site consists of a future Scugog River crossing located within the Colborne Street right-of-way and encompasses several properties in Lindsay, Ontario with an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

A Site location map including nearby features is shown in **Figure 1 (Appendix A)**.

2. Records Review

2.1 General

2.1.1 Phase One Study Area Determination

The Phase One Study Area, herein referred to as the "Study Area", has been assessed and determined to be inclusive of the area within 250 m radius of the Phase One Property boundary. For the purpose of this report, the Study Area is inclusive of properties in whole or in part within 250 m of the Phase One Property. The boundaries of the Site and Study Area are shown in **Figure 1 (Appendix A)**.

Information obtained from the City of Kawartha Lakes Maps and Apps online mapping tool indicates that the areas surrounding the project area are mainly residential with some commercial and community facility to the east. Zoning within the project area is a mix of residential, commercial and open space (City of Kawartha Maps and Apps 2023).

2.1.2 Chain of Title

As the Site encompasses more than one property, chain of title records were requested through Environmental Risk Information Services (ERIS) for the properties at 140 William Street and 95 Lindsay Street North. The chain of title search indicates that the property at 140 William Street is currently owned by Revera William Place Retirement and 95 Lindsay Street North is owned by the City. The property at 140 William Street was noted to have previously been owned by AB'S Esso Serv. (1972), Alzeimers Society Victoria County (1995/96), and William Place Retirement Residence (2012 and 2017), while the property at 99 Lindsay Street North was previously owned by Sylvester Steel Products Company Limited (1972 and 1975).

2.1.3 Environmental Reports

Historical environmental reports were provided for review as part of the preparation of this Phase One ESA by the City for the Site and properties within the Study Area. The following section identifies and summarizes the relevant information presented in each of the key documents provided that added additional relevant information pertaining to the Site.

Report on Soil Conditions, Scugog River Bridge, Colborne Street, Lindsay, Ontario prepared by Totten Sims Hubicki Associates Limited, April 1992.

The County of Victoria retained Totten Sims Hubicki Associates to perform a subsurface soils investigation for the proposed bridge crossing at the Scugog River at Colborne Street in the Town of Lindsay, Ontario.

The purpose of the investigation was to provide geotechnical information for preliminary design of foundations. At the time of the study, the west side of the investigated area was bounded on the north by an apartment and by Carew Park including a pumping station and a senior citizen complex on the south. On the east side of the river, the site was adjacent to the southern boundary of Rivera Park and immediately north of the former “Shaft Machines” property. Boreholes were placed near the proposed bridge structure crossing.

The assessment was completed primarily on the information obtained from the advancement of three (3) boreholes using standard penetration tests (SPT) as well as the collection of soils encountered in the test borings. The soil samples were submitted for laboratory testing.

From the soil boring, it was determined that on both sides of the river, a fill zone extends approximately 1 to 2 metres (m) below ground surface (bgs) and consists primarily of brown silt and sandy soils containing some gravel and trace clay. Underlying the silty sand fill, a black organic silt deposit approximately 1 m think, was encountered in two of the boreholes. Underlying the organic material was a 400 mm thick grey silty sand till deposit containing some stone. Limestone bedrock of the Trenton Formation was encountered at borehole 101 and inferred at borehole 102 at an approximate elevation of 248.8 m. Approximately 300 mm of highly weathered limestone was encountered in borehole 103 before refusal.

Scugog River Crossing Class Environmental Assessment Environmental Study Report prepared by The Corporation of The County of Victoria Transportation and Public Works Department, January 1994.

The Corporation of The County of Victoria Transportation and Public Works Department completed a Class Environmental Assessment for the Scugog River Crossing in January 1994. The main objective of the assessment was to re-examine the need for additional crossing capacity of the Scugog River in, or adjacent to the Town of Lindsay, identify the scope and nature of the transportation improvements required to satisfy existing and future river crossing demand and if appropriate, select a crossing location and identify any property that should be protected for its construction.

As part of the Class EA, The Ministry of Natural Resources, Ministry of the Environment, Kawartha Region Conservation Authority and the Town of Lindsay were contacted regarding potential contamination on adjacent lands to the river within the Study Area as well as in the Scugog River.

No known contaminants were reported within the riverbed of the Study Area. Coal-tar contamination was identified on lands adjacent to the Scugog River in the South-east quadrant of the Wellington Street/William Street intersection (former location of Lindsay Hydro). The full extent of the contamination was not known at the time of the assessment and was deemed difficult to estimate unless a detailed site investigation was initiated. The land at that time was used as parking facilities and construction impacting the property was not permitted at that time.

City of Kawartha Lakes, Colborne Street Class B Environmental Assessment and Corridor Study prepared for City of Kawartha Lakes. HDR Corporation, July 2020.

HDR Corporation was retained by The City of Kawartha Lakes in July 2020 to complete a Class B Environmental Assessment and Corridor Study for two of its primary east-west corridors, Colborne Street West and Kent Street West. The limits of the study for Colborne Street West were from Highway 35 to William Street North and for Kent Street West the limits were from Highway 35 to Lindsay Street North.

The purpose of the study was to determine the specific transportation needs for the Colborne Street corridor from Highway 35 to William Street, identifying improvements to both safety and accessibility within the corridors while maintaining or increasing capacity of the road network to accommodate future growth. The study was an operational review, which was carried out as a Schedule 'B' Class EA following Phases 1 and 2, in accordance with the Municipal Engineers Association, Municipal Class Environmental Assessment. Potential areas or sources of contamination were not addressed within this study.

2.2 Environmental Source Information

2.2.1 City Directories

A City Directory Search was requested through the ERIS for 99 Lindsay Street North and 140 William Street North.

99 Lindsay Street North was not listed from 1925 – 1972. In 1972 it was listed as Sylvester Stl Prod Co Ltd and in 1975, it was listed as Sylvester Steel Products Company Limited (Railway Equip). No listings were found from 1981 to 2021.

140 William Street North was not listed from 1925 – 1939. In 1972, it was listed as Ab's Esso Serv. It was listed as Vacant in 1975 and was not listed again until 1991 as Apartments. In 1995/1996, it was listed as Residence on William Street, Alzheimers Society of Canada, and apartments. In 2001/2002, it was listed as Residence on William Street and Apartments. From 2012 it was listed as William Place Retirement. In 2017, it was listed as William Place Retirement, William Place Retirement RSDNC and William Place. In 2021, it was listed as Revera William Place Retirement Residence.

City Directories are provided in **Appendix B**.

2.2.2 Fire Insurance Plans

A Fire Insurance Plan Search was requested through the ERIS. These were prepared by Underwriters' Survey Bureau Limited in 1911 and 1949.

The 1911 fire insurance plan (sheet no. 2) illustrate a sawmill and several shingle sheds on the west bank of the Scugog River within the boundary of the Site. Lumber and log storage was also present along the west bank within the Site boundary. A number of residences were present along Regent Street, William Street, and Colborne within the Site limits. A manufacturing complex, consisting of several buildings, referred to as the Madison Williams Mfg. Company Limited is present along the eastern bank of the Scugog River within the Site limits. To the east of the manufacturing complex is a line belonging to the Grand Trunk Railway (G.T. Ry) traversing part of the Site from north to south.

The 1949 fire insurance plan (sheet no. 2) also illustrates the sawmill, lumber yard, log storage, and residences on the west bank of the Scugog River within the boundary of the Site. The shingle sheds no longer appear along the bank. The manufacturing complex is still present, however, the railway to the east now parallels Lindsay Street North, which resides immediately to the east.

Fire insurance plans are presented in **Appendix B**.

2.2.3 Technical Standards and Safety Authority

A records search from The Technical Standards & Safety Authority (TSSA) Fuels Safety Division was deemed not necessary as part of this Phase One ESA; therefore, records were not provided or reviewed as part of this report.

2.2.4 Freedom of Information

A Freedom of Information (FOI) request was submitted to the Ministry of Environment, Conservation, and Parks (MECP) on April 14, 2023, regarding records relating to the Site. A response was received on May 1, 2023, regarding the property located at 99 (9599) Lindsay Street North. Following a search of the MECP records, no records were reported to have been located for the property. A response was received on June 2, 2023, regarding the property located at 140 William Street North. The FOI records provided are as follows:

- An Ontario Regulation 347 Waste Generator report lists one active waste class on the property for Rivera Inc. (ON9823784) relating to inert inorganic wastes (Waste class, 150 – L);
- An MECP Inspection Report from the Compliance Branch dated October 30, 2013. The report summarized an inspection carried out to confirm compliance with O. Reg 103/94. The report indicated that the facility located at the property was in compliance and no further actions were deemed necessary.

A record of the request correspondence is provided in **Appendix B**. CIMA+ will forward any further MECP correspondence with applicable recommendations upon receipt where applicable.

2.2.5 Environmental Risk Information Services Data Bases

A records and regulatory agency databases review was completed by ERIS. The search area was defined as the Study Area delineated by a 250 m radius of the Site. The ERIS (2023) report dated April 14, 2023, includes a search of federal, provincial, and private database records for the Site as well as for properties located within the Study Area. A copy of the ERIS Custom Report is included in **Appendix B.**

A summary of the results for records associated with properties located within the Phase One Property and Study Area is provided in **Table 1** below. A total of thirty-two (32) records were identified within the Phase One Property among the ERIS database results.

Table 1: ERIS Search Results

Data Base	Name	Phase One Property	Study Area (within 250 m)
AAGR	Abandoned Aggregate Inventory	0	0
AGR	Aggregate Inventory	0	0
AMIS	Abandoned Mine Information System	0	0
ANDR	Anderson's Waste Disposal Sites	**1**	**1**

Data Base	Name	Phase One Property	Study Area (within 250 m)
AST	Above Ground Storage Tanks	0	0
AUWR	Automobile Wrecking & Supplies	0	0
BORE	Borehole	0	0
CA	Certificates of Approval	**1**	**1**
CFOT	Commercial Fuel Oil Tanks	0	0
CHEM	Chemical Manufacturers and Distributors	0	0
CHM	Chemical Register	0	0
CNG	Compressed Natural Gas Stations	0	0
COAL	Inventory of Coal Gasification Plants and Coal Tar Sites	0	0
CONV	Compliance and Convictions	0	0
CPU	Certificates of Property Use	0	0
DRL	Drill Hole Database	0	0
DTNK	Delisted Fuel Tanks	0	**1**
EASR	Environmental Activity and Sector Registry	0	**1**
EBR	Environmental Registry	0	0
ECA	Environmental Compliance Approval	**5**	0
EHS	ERIS Historical Searches	**3**	**22**
EMHE	Emergency Management Historical Event	**0**	**0**
EPAR	Environmental Penalty Annual Report	0	0
EXP	List of Expired Fuels Safety Facilities	0	0
FST	Fuel Storage Tanks	0	0
FSTH	Fuel Storage Tanks - Historic	0	0
GEN	Ontario Regulation 347 Waste Generator Summary	**1**	**18**
HINC	TSSA Historic Incidents	0	0
INC	Fuel Oil Spills and Leaks	0	0
LIMO	Landfill Inventory Management Ontario	0	0
MINE	Canadian Mine Locations	0	0
MNR	Mineral Occurrences	0	0

Data Base	Name	Phase One Property	Study Area (within 250 m)
NCPL	Non-Compliance Reports	0	0
OGWE	Oil and Gas Wells	0	0
OOGW	Ontario Oi and Gas Wells	0	0
OPCB	Inventory of PCB Sites	0	0
ORD	Orders	0	0
PAP	Canadian Pulp and Paper	0	0
PES	Pesticide Register	0	**1**
PINC	Pipeline Incidents	**2**	**10**
PRT	Private and Retail Fuel Storage Tanks	0	**1**
PTTW	Permit to Take Water	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	0	0
RSC	Record of Site Condition	0	**2**
RST	Retail Fuel Storage Tanks	0	0
SCT	Scott's Manufacturing Directory	0	**1**
SPL	Ontario Spills	**3**	**20**
SRDS	Wastewater Discharger Registration Database	0	0
TANK	Anderson's Storage Tanks	0	0
VAR	Variances for Abandonment of Underground Storage Tanks	0	0
WDS	Waste Disposal Sites – Moe CA Inventory	0	0
WDSH	Waste Disposal Sites – MOE 1991 Historical Approval Inventory	**1**	0
WWIS	Water Well Information System	**15**	**14**

A copy of the ERIS Custom Report is included in **Appendix B**. It should be noted that locations of database entries presented in the report do not necessarily relate to the exact location of the event/item identified in the entry. As such, drawing conclusions based on the direction and distance from the Site should be taken with due consideration.

2.2.5.1 Anderson's Waste Disposal Sites

Information within this database was collected by examining various historical documents which intends to ascertain the likely position of former waste disposal sites from 1860 to present.

SUMMARY
Two (2) records for former waste disposal sites were identified within the ERIS report. • The St Paul-Dennison Dump is described as having been active in the 1930s and located on the east side of the Scugog River, west of Lindsay Street North, inferred to be within the boundary of the Site; • The alternate site of the St Paul Dennison Dump, which the record describes as having conflicting coordinates based on the described location. This record locates the dump near the intersection of St Paul Street and Dennison Street based on aerial photography, which would place it outside of the Site, but within a 250 m radius.

2.2.5.2 Certificates of Approval

This database contains approvals for Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management, and Energy Certificate of Approvals.

SUMMARY
The following Certificate of Approval was found within the Site. • C of A # 9575-7REHWY. Issued in 2009 for Municipal and Private Sewage Works for The Corporation of the City of Kawartha Lakes at Francis and William St, Kawartha Lakes, Ontario. The following Certificate of Approval was found within the 250 m radius of the Site. • C of A # 8-4161-98. Issued in 1998 for Industrial Air for 3176461 Canada Inc., Nexacor Realty at 91 William Street North, Lindsay, Ontario.

2.2.5.3 Delisted Fuel Tanks

List of fuel storage tank sites that were once found in - and have since been removed from the list of fuel storage tanks made available by the regulatory agency under Access to Public Information.

SUMMARY
One (1) site was found within the Study Area. • One (1) record pertains to fuel storage at 91 William Street North, located approximately 151 m south-southwest of the of the Site.

2.2.5.4 Environmental Activity and Sector Registry

The Environmental Activity and Sector Registry (EASR) allows businesses to register certain activities with the MECP, rather than apply for a specific approval. The registry is available for common systems and processes, to which pre-set rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing.

SUMMARY
One (1) EASR record was found within the Study Area. • One (1) record pertaining to construction Dewatering associated with Maple Reindeers Constructors Ltd. located adjacent to the south-eastern boundary of the Site.

2.2.5.5 Environmental Compliance Approval

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past business had to apply for multiple approvals (known as Certificates of Approval) for individual processes and pieces of equipment. Today, a business either registers itself or applies for a single approval, depending on the type of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of the business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required.

SUMMARY
Five (5) Environmental Compliance Approvals were found within the Site. • ECA # 1328-AN5PBL – Municipal and Private Sewage Works for The Corporation of the City of Kawartha Lakes at 95 Lindsay St N • ECA # 0640-4H3QNN – Municipal and Private Sewage Works for The Corporation of the City of Cambridge at Francis and William St • ECA # 1311-746S2Z – Municipal and Private Sewage Works for The Corporation of the Town of Carleton Place at Francis and William St • ECA # 9575-7REHWY – Municipal and Private Sewage Works for The Corporation of the City of Kawartha Lakes at Francis and William St • ECA # 8581-7REHS5 – Municipal and Private Sewage Works for The Corporation of the City of Kawartha Lakes at Francis and William St

2.2.5.6 ERIS Historical Searches

ERIS has compiled a database of all environmental risk reports completed since 1999. Site location, date of report, type of report and search radius are the available fields in this database.

SUMMARY
ERIS historical searches (EHS), three (3) have been completed for properties within Site. • 2009, 2019 (Order # 20090427013, 20190307143) Two (2) Custom Reports for 140 William Street North, which is currently William Place Retirement Residence; • 2016 (Order # 20160912070) A Standard Report for 132 William Street North, which is currently Coldwell Banker - R.M.R. Real Estate. ERIS historical searches (EHS), twenty-two (22) have been completed for properties within Study Area. • 2006 (Order # 20060810023) A Site Report for for an unknown address (Coords: 44.362922; -78.73815); • 2006, 2008 (Order # 20060529016, 20081113012) A Site Report and a Complete Report for 66 Williams Street North, which is currently a bicycle repair shop; • 2009 (Order # 22080200605) An RSC Report for Part Lots 5 & 6, North Of King Street; • 2010 (Order # 20100531023) A Standard Report for 36 Wellington Street, which is currently a residential building; • 2012, 2021 (Order # 21030300021, 20120627031) Two (2) Standard Reports and two (2) Custom Reports for 2 Colborne Street West, which is currently a residence; • 2015 (Order # 20150811111) A Standard Report for 29 Lindsay Street North, which is currently a residential building; • 2016 (Order # 20161103090) A Custom Report for an unknown address (Coords: 44.358878; -78.735755), which is currently a residential building; • 2016 (Order # 20160114144) A Standard Report for 5 Bond Street East, which is currently a residence; • 2019 (Order # 20190827108) An RSC Report for 76 William Street North, which is currently a car dealership; • 2019 (Order # 20190402025) An RSC Report for 46-64, & 66 William Street North;

- 2021 (Order # 21082400088) Three (3) Standard Reports for 68 Lindsay Street North, which is currently a residential building;
- 2021, 2022 (Order # 21070200047, 22080200605) Two (2) RSC Reports and Three (3) Custom Reports for 77 to 83 William Street North.

2.2.5.7 Ontario Regulation 347 Waste Generators Summary

The Ontario EPA and Ontario Regulation 347 define a waste generation site as any site, equipment or operation involved in the production, collection, handling or storage of regulated wastes. The generator of a regulated waste is required to register the Site and each individual waste stored, collected, produced, or handled at the Site.

ERIS SUMMARY

Ontario Regulation 347 Waste Generators, one (1) have been identified within the Site

- Generator No. ON9823784, registered to Revera Inc. for 140 William Street North, listed for inert inorganic wastes. (2014).

Ontario Regulation 347 Waste Generators, eighteen (18) were identified within the Study Area.

- Generator No. ON9807148, registered to D.D. 2 Colborne Ltd. for 2 Colborne Street West Building A, listed for oil skimmings and sludges (2016);
- Generator No. ON8591837, registered to Ward and Burke Microtunnelling for 2 Colborne Street West for inert organic wastes. (2017);
- Generator No. ON0473747, registered to Bell Canada for 91 William Street North, listed for various waste classes: alkaline wastes – heavy metals, waste compressed gases (1997 – 2001, 2009);
- Generator No. ON9892171, registered to Bell Canada for 91 William Street North, listed for various waste classes: alkaline wastes – heavy metals, light fuels, oil skimmings and sludges. (2009 - 2022);
- Generator No. ON9698129, registered to Canadian Addiction Treatment Clinics LP for 40 Lindsay Street for pathological wastes. (2022);
- Generator No. ON0293700, registered to County of Victoria for 28 Francis Street (Site RR #2) for waste oils and lubricants (1986 - 1988);
- Generator No. ON0698600, Garry's Tree Service Ltd for 85 William Street North for petroleum distillates (1986 – 1990; 1992 - 1998);
- Generator No. ON0863100, Lindsay Hydro Electric System for 66 William Street North for various waste classes: petroleum distillates, oil skimmings and sludges, waste oils and lubricants (1986 – 1987; 1988 – 1990; 1992 - 1998).

2.2.5.8 Pesticide Register

This database includes licensed operators and vendors registered with pesticides.

SUMMARY

One (1) pesticide register record was identified within the Study Area. The record pertains to a legacy operator's license for Selective Spray & Cut located at 83 Lindsay Street North and is not considered to be of interest with respect to the indication of potential environmental concern within the Site.

2.2.5.9 Pipeline Incidents

SUMMARY
Two (2) pipeline incidents were identified in the ERIS report within the Site and ten (10) were identified within the Study Area. These pertain to natural gas pipeline strikes or water supply pipe strikes and are not considered to be of interest with respect to the indication of potential environmental concern within the Site.

2.2.5.10 Private and Retail Fuel Storage Tanks

SUMMARY
One (1) private and retail fuel storage tank was identified within the Study Area. • One (1) with an unlisted capacity at 76 William St North, which expired in 1994.

2.2.5.11 Record of Site Condition

A Record of Site Condition (RSC) is an investigation that is filed with the MECP Brownfields Environmental Site Registry. They establish the environmental condition of a property where activities on the property may caused contamination to the soil or groundwater. An RSC typically needs to be filed when the Site is proposed to be developed for a different land use (commercial to residential).

SUMMARY
Two (2) records of RSC were identified in the ERIS search for the Study Area. • RSC was filed for 5 Bond St East in February 2006; • RSC was filed for 36 Wellington Street in October 2010.

2.2.5.12 Scott's Manufacturing Directory

The database contains information on more than 200,000 manufactures across Canada which includes information related to the company address, plant size and main products.

SUMMARY
One (1) property was identified under the Scott's Manufacturing Directory within the Study Area. • Discount Bait & Tackle (aka. Kawartha Lakes Bait and Tackle), which is located at 10 Queen Street. Established in 1992. Sporting and Athletic Goods Manufacturing.

2.2.5.13 Ontario Spills

This database identifies approximate location, type and quantity of contaminant, date of incident or spill, environmental impact, cause, nature of impact, made available by the MECP.

SUMMARY
A total of three (3) spills were identified in the ERIS report for the Site. • 2018 – No address provided (Coords: 44.361319; -78.737294). Discharge or to Scugog River of soap and water mixture. No volume identified; • July 2015 – 158 William Street North. A break or leak causing a release of natural gas; • August 2015 – 160 William Street North. A break or leak causing a release of natural gas. A total of twenty (20) spills were identified within the Study Area. Of these records, the following are identified to be of interest with respect to the indication of potential environmental concern given their nature and position relative to the Site. • 1991 - Abex Industries Ltd. Sinister Creek At St. David Street. Unknown volume of cooling water to Sinister Creek. Environmental impact not anticipated; • 1999 – located at Sinister Creek At St. David Street. Oil sheen on Scugog River from unknown source. Surface water contamination was confirmed 2018 – The Corporation of the City of Kawartha Lakes. Located at 87 Lindsay Street North. Untreated sewage discharged to surface and then to Scugog River; • 2018 – The Corporation of the City of Kawartha Lakes. Located at 87 Lindsay Street North. Untreated sewage discharged to surface and then to Scugog River; • 2018 – GFL Environmental Inc. located at 83 Lindsay Street North. 30 litres of hydraulic fluid released to drainage ditch and Scugog River; • 2018 – GFL Environmental Inc. located at 83 Lindsay Street North. 5 litres of hydraulic fluid released to drainage ditch and Scugog River; • 2019 – located at 5 Bond Street East. Unknown volume of untreated sewage discharged to surface; • 2018 – Miller Waste Systems Inc. at 64 St. Paul's Street. 80 litres of diesel fuel to the road due to human/operator error. Contained; • 2019 – located at 2 Colbourne Street West. 100 litres of untreated sewage discharged to surface. Cleaned; • 2020 – located at 68 Lindsay Street North. Unknown volume of heat transfer fluid to the ground.

2.2.5.14 Waste Disposal Sites – MOE 1991 Historical Approval Inventory

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

SUMMARY
One (1) record for a former waste disposal site was identified within the Study Area. Based on the results from the WDS records listed above, the Lindsay Street North site is described as having been active in the 1970s and is designated as unplottable.

2.2.5.1 Water Well Information System

This database identifies water wells found within Ontario that are in accordance with O. Reg 903. The information provided typically includes well locations, construction dates, well depths, use, static level, well status and well use. Information related to stratigraphy, depth to bedrock and approximate depth to water table is also included.

SUMMARY
Fifteen (15) water well records were found within the boundaries of the Site, fourteen (14) were monitoring wells, and one (1) abandoned / other status. Fourteen (14) well records were identified within the Study Area. See **Section 2.3.5** for a summary of pertinent well records.

2.3 Physical Setting Sources

2.3.1 Aerial Photographs

Aerial photographs obtained from Google Earth (Google Earth Pro 2023) and Ecolog ERIS (ERIS 2023) were used to identify the development history of the Site and surrounding area. Photographs analysed in this report were limited to dates between 1940 and the present.

A description of the Site and the Study Area including their features are described in **Table 2** for each aerial photograph which are included in **Appendix C**.

Table 2: Aerial Photograph Interpretation

PHOTOGRAPH	SCALE	DATE	DESCRIPTION
Ecolog ERIS (via NAPL) **Kawartha Lakes, ON and Surrounding Area**	1:10000	1959	The Site appears to be mainly undeveloped in proximity to the Scugog River, with some residential areas on-Site on the west side of the river and part of an inferred commercial/industrial operation and rail corridor on the east side.
Ecolog ERIS (via NAPL) **Kawartha Lakes, ON and Surrounding Area**	1:10000	1964	No significant changes to the Site noted from 1959.
Ecolog ERIS (via NAPL) **Kawartha Lakes, ON and Surrounding Area**	1:10000	1976	No significant changes to the Site noted from 1964 with the exception of inferred construction of new roadways on both sides of the river.
Ecolog ERIS (via NAPL) **Kawartha Lakes, ON and Surrounding Area**	1:10000	1981	No significant changes to the Site or surrounding area were noted since 1976. The addition of what looks like apartment buildings or townhouses along the west side of the river.
Googe Earth Pro **Kawartha Lakes, ON and Surrounding Area**	-	2007	Additional housing, parking lots, and the retirement residence is present along west side of the river. The inferred rail corridor and industrial/commercial operations appears to have been decommissioned on the east side of the river and replaced by parkland/greenspace.
Ecolog ERIS (via MAXAR) **Kawartha Lakes, ON and Surrounding Area**	1:10000	2012	No significant changes to the Site noted from 2007.
Google Earth Pro **Kawartha Lakes, ON and Surrounding Area**	-	2018	Construction is occurring on-Site both on the west and east sides of Lindsay Street. Green space with parking and a pump house between Lindsay Street North/Colborne Street intersection and the river. An inferred construction staging area is present on the east side of Lindsay Street.
Google Earth Pro **Kawartha Lakes, ON and Surrounding Area**	-	2019	Construction of pump house and apartment buildings on the east side of the river are complete.

2.3.2 Topography, Hydrogeology, Geology

2.3.2.1 Topography

Topographically, the Site is shown on Natural Resources Canada Topographic Map 031D07 (NRC, 2023), see map provided in **Appendix D**. This shows that the Site is located within a region of relatively flat ground surface topography with an elevation of approximately 250 meters above sea level (m asl) with a gradual decline towards the Scugog River from the eastern and western parts of the Site.

2.3.2.2 Hydrogeology

Based on the available topographic and geological information, a component of local groundwater flow is inferred to be oriented to the north/northwest following the Scugog River which bisects the Site and flows in a northerly direction. Regional groundwater flow is inferred to be oriented to the north/northwest following regional ground surface topography towards Sturgeon Lake.

2.3.2.3 Overburden and Bedrock Geology

Overburden at the Site has been described to consist of stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain. (Ontario Geological Survey, 2020). Bedrock geology for the area consists of limestone, dolostone, shale, arkose, sandstone of the Ottawa Group, Simcoe Group and Shadow Lake Formation of the Middle Ordovician.

Bedrock and surficial geology mapping are provided in **Figures 2** and **3 (Appendix A)**.

2.3.3 Fill Materials

No evidence of fill associated with historical activities was identified as part of the records review or observed during the Site reconnaissance; however, the use of imported fill associated with roadway construction and housing development is inferred.

2.3.4 Water Bodies, Areas of Natural Significance

The Scugog River traverses the Site from north to south. No other areas of natural significance are present in the Phase One Study Area.

2.3.5 Well Records

According to the ERIS Report and the online Water Well Information System (WWIS), fifteen (15) water well records found within the Site (**Figure 4**, **Appendix A**), fourteen (14) were monitoring wells, and one (1) abandoned / other status.

The remainder of the well records pertain to locations within the 250 m Study Area (**Figure 4**, **Appendix A**), of which the majority of these were related to water supply wells and a variety of abandoned old municipal, and irrigation or domestic supply wells.

A summary of pertinent information obtained with respect to WWIS records for on-Site wells is provided in **Table 3**. Properties within the Site and Study Area are supplied by a municipal drinking water system operated by the City. The WWIS database search results are provided in the ERIS report in **Appendix B**.

Table 3: Well Records

MECP Well ID (EcoLog ERIS ID)	Location	Stratigraphy	Approximate depth to bedrock	Approximate depth to water table
7283906 **(WWIS-1)**	On-Site	Layer 5: Grey rock (2.59 ~ 17.98 m) Layer 4: Grey rock (1.98 ~ 2.59 m) Layer 3: Brown Silty Sand with Till (1.52 ~ 1.98 m) Layer 2: Brown Silty Sand with Gravel – (0.76 ~ 1.52 m) Layer 1: Sandy, Silty Fill (0 ~ 0.76 m)	1.98 mbgs	Water Found at 1.52 mbgs Not specified
7297443 **(WWIS-6)**	On-Site	Layer 3: Brown Silty Sand (4.57 ~ 6.1 m) Layer 2: Brown Sand (2.44 ~ 4.57 m) Layer 1: Brown Sand with Rock (0 ~ 2.44 m)	Not Specified	Not specified
7221167 **(WWIS-10)**	On-Site	Layer 2: Grey Silt and Fine Sand (4.88 ~ 7.32 m) Layer 1: Brown Sand with Silt and Gravel (0 ~ 4.88 m)	Not Specified	Not specified
7221165 **(WWIS-11)**	On-Site	Layer 3: Grey Silty Clay – (4.88 ~ 6.10 m) Layer 2: Packed Grey Silt (2.44 ~ 4.88 m) Layer 1: Brown Sand with Silt and Gravel (0 ~ 2.44 m)	Not Specified	Not Specified
7133885 **(WWIS-12)**	On-Site	Layer 4: Grey Silt with Clay, dense (5.18 ~ 6.1 m) Layer 3: Dense Grey Sand with Silt (4.57 ~ 5.18 m) Layer 2: Dense Brown Sand (2.44 ~ 4.57 m) Layer 1: Brown Sand with Loose Rock (0 ~ 2.44 m)	Not Specified	Not Specified
7343417 **(WWIS-13)**	On-Site	Layer 4: Fractured Grey Limestone with Silt (7.62 ~ 9.14 m) Layer 3: Brown till (3.05 ~ 7.62 m) Layer 2: Brown Fill (0.3 ~ 3.05 m) Layer 1: Black Other (0 ~ 0.3 m)	Not Specified	Not Specified
7221164 **(WWIS-14)**	On-Site	Layer 3: Brown Sand and Silt, Hard (4.88 ~ 6.71 m) Layer 2: Grey Silt with Clay and Gravel (1.5 ~ 4.88 m) Layer 1: Brown Silt with Clay and Gravel (0 ~ 1.5 m)	Not Specified	Not Specified

MECP Well ID (EcoLog ERIS ID)	Location	Stratigraphy	Approximate depth to bedrock	Approximate depth to water table
7343418 **(WWIS-15)**	On -Site	Layer 3: Brown Till (2.44 ~ 6.1 m) Layer 2: Brown Fill (0.3 ~ 2.44 m) Layer 1: Black Other (0 ~ 0.3 m)	Not Specified	Not Specified
7133881 **h(WWIS-16)**	On -Site	Layer 4: Grey Clay, Dense (5.79 ~ 7.32 m) Layer 3: Grey Sand with Silt, Dense (2.44 ~ 5.79 m) Layer 2: Brown Sand, Dense (0.3 ~ 2.44 m) Layer 1: Brown Sand with Rock, Loose (0 ~ 0.3 m)	Not Specified	Not Specified
7221168 **(WWIS-17)**	On -Site	Layer 2: Grey Silt with Gravel and Clay (4.57 ~ 6.10 m) Layer 1: Brown Sand with Gravel, Hard (0 ~ 4.57 m)	Not Specified	Not Specified
7221166 **(WWIS-19)**	On -Site	Layer 2: Grey Silt, Hard, Water-bearing (4.27 ~ 6.10 m) Layer 1: Brown Silt With Clay and Gravel (0 ~ 4.27 m)	Not Specified	Not Specified Not Specified

2.4 Site Operating Records

No Site Operating Records are available for the Site.

3. Interviews

An interview questionnaire was provided by CIMA+ and was completed by a City representative identified to be knowledgeable with respect to both the current and historical Site uses. As per the interview record provided in **Table 4**, individuals provided information regarding the history of the Site and the surrounding properties within the Study Area to the best of their knowledge:

Table 4: Interview Record

Person Interviewed	Relationship to Phase One Property	Date and Place of Interview	Interview Method
Corby Purdy	Manager, Infrastructure Design and Construction	July 25, 2023	By email

Mr. Purdy was interviewed given their familiarity with the recent operational history of the Site. Mr. Purdy is referred to herein as the “Site Representative”.

CIMA+ compared the information obtained from the interviews with information obtained from the historical records. The information provided by the Site Representative was corroborated by the available historical records and results of the records review completed herein.

4. Site Reconnaissance

The Site visit was conducted by Lake Johnston, Environmental Professional from **CIMA+** on April 13, 2023. The duration of this visit was approximately one (1) hour, and the weather conditions were sunny, no precipitation and 28°C.

The Site visit consisted of a visual assessment and walkthrough from roadways and publicly accessible areas to identify land use and potential PCA on-Site or within the Study Area. The inspection was limited to the observation of visible and accessible elements, which do not include destructive activities (intrusive). The inspector focused primarily on specific zones identified during the records review within the general limitations of the study Site (ex.: physical obstacles). No buildings were accessed during the Site visit. Site photographs are provided in **Appendix C**.

At the time of the Site visit, the Phase One Property was observed to be occupied by a combination of residential, including apartments, a retirement home, some office buildings as well as parkland and pump house on the east side of the Scugog River. The on-Site surface was observed to consist of a mix of asphalt, concrete, rock, grassed and landscaped areas. No stressed vegetation was observed during the Site visit. Tributaries and culverts were observed on the east bank of the area of the proposed bridge. Monitoring wells were observed within the parking lot of the William Place Retirement Home (140 William Street). A pad mounted transformer was observed at the Retirement Home as well as a transformer on the west side of the apartment buildings. On the east side of the river, a transformer was observed at the pump house. A large diameter red culvert was observed on the east side of the river near the proposed bridge. Two monitoring wells were visible on a vacant fenced off property near the southern extent of the Site.

Investigation of the properties with a 250 m radius of the project area were limited to the visual identification of elements which represent environmental liabilities, as viewed from publicly accessible locations.

5. Conclusions and Recommendations

CIMA+ was retained by The Corporation of the City of Kawartha Lakes to complete a Phase One Environmental Site Assessment (ESA) in general accordance with O. Reg. 153/04 (as amended) as part of detailed design of the Colborne Street Bridge located in Lindsay, Ontario.

Based upon the information and data collected via government sources, historical records, and data gathered during the Site visit conducted on April 13, 2023, the following PCA were identified as per **Table 5**.

Table 5: Potentially Contaminating Activities (PCA)

Potentially Contaminating Activity Number	Potentially Contaminating Activity	Location of Potentially Contaminating Activity (on-Site and off-Site)
18	Electricity Generation, Transformation and Power Stations	South-east quadrant of William and Wellington Street (former Lindsay Hydro) – Coal Tar (historical Report)
28	Gasoline and Associated Products Storage in Fixed Tanks	Former gas station located at 140 William Street North

Potentially Contaminating Activity Number	Potentially Contaminating Activity	Location of Potentially Contaminating Activity (on-Site and off-Site)
34, 46, 54	Metal Fabrication; Textile Manufacturing and Processing; Rail Yards, Tracks and Spurs	Madison-Williams Mfg. formerly located at 99 Lindsay Street North. Ltd. Former Grand Trunk Railway (G.T. Ry) line and Sylvester Steel Products Company Limited (Railway Equip) formerly located at 99 Lindsay Street North
58	Waste Disposal and Waste Management	A former landfill located near the intersection of St. Paul Street and Dennison Street
59	Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	Former sawmill, lumber yard, log storage present along west bank of river within the Site boundary

On-Site

- ***Item No. 28 - Gasoline and Associated Products Storage in Fixed Tanks.*** According to the City Directory search, a business named “Ab’s Esso Serv” [sic] was located at 140 William Street North in 1972. The property was marked as vacant as of 1975. The property was identified as a potential environmental concern for on-Site contamination related to the occurrence of former gas station activities.
- ***Item No 34, 46, 54 – Metal Fabrication; Textile Manufacturing and Processing; Rail Yards, Tracks and Spurs.*** Based on the City Directory search, Sylvester Steel Products Company Limited, a railway equipment company, was formerly located at 99 Lindsay Street North between 1972 and 1975. Based on fire insurance maps, the former Grand Trunk Railway traversed the eastern part of the Site from north to south from at least 1911 and the textile manufacturing firm, Madison-Williams was also formerly located at 99 Lindsay Street North. The property and a portion of Lindsay Street North immediately to the east was identified as a potential environmental concern for on-Site contamination related to former railway operations.
- ***Item No. 58 – Waste Disposal and Waste Management, including thermal treatment, landfilling, and transfer of waste, other than use of biosoils or soil conditioners.***

  The St Paul-Dennison Dump is described as having been active in the 1930s and located on the east side of the Scugog River, west of Lindsay Street North. The alternate site of the St Paul Dennison Dump, which the record describes as having conflicting coordinates based on the described location. This record locates the dump near the intersection of St Paul Street and Dennison Street based on aerial photography, which would place it outside of the Site, but within the Study Area.
- ***Item No. 59 – Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products.***

  Based on the fire insurance maps, a sawmill and lumber/log storage were present on the west bank of the Scugog River within the boundary of the Site from at least 1911 to 1948. The sawmill was located where Colborne Street West currently terminates on the west bank of the Scugog River. Lumber/log storage yards were present to the north of the sawmill along the bank of the river and ended where Regent St. currently terminates.

Off-site

+ ***Item No. 18 - Electricity Generation, Transformation and Power Stations.***

  According to historical reports (see Section 2.1.3) A former Lindsay Hydro location was located in the south-east quadrant of William and Wellington Street. Historical reports also identify possible coal tar contamination in association with this location.

Based on a review of the available information and the exercise of professional judgment several APECs have been identified in **Table 6** for the Site. The PCA's and associated APEC's are shown in **Figure 5** of **Appendix A**.

Table 6: Areas of Potential Environmental Concern (APEC)

Area of Potential Environmental Concern	Potentially Contaminating Activity	Location	Contaminants of Potential Concern	Media Potentially Impacted
A	***Item No. 28, 59 -*** *Gasoline and Associated Products Storage in Fixed Tanks, Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products*	On-site	PAH, PHC F1-F4, BTEX, and metals	Soil, Groundwater
B	***Item No 34, 46, 54, 58 –*** *Metal Fabrication; Textile Manufacturing and Processing ; Rail Yards, Tracks and Spurs, Waste Disposal and Waste Management, including thermal treatment, landfilling, and transfer of waste, other than use of biosoils or soil conditioners*	On-site	PAH, PHC F1-F4, VOC, and metals	Soil, Groundwater
C	***Item No. 59 –*** *Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products*	On-site	PAH, PHC F1-F4, VOC, and metals	Soil, Groundwater

A Phase One ESA does not include surface or subsurface testing of media (soil, sediment and/or groundwater) for COPC or known COC and therefore the conclusions of the report are limited to the identification of PCA that may contribute to APEC on the Phase One Property. The investigation of APEC, if required based on the conclusions of the Phase One ESA, are done by way of a recommendation to complete a Phase Two ESA.

Based on the results of the Phase One ESA provided herein, a Phase Two ESA is recommended to investigate the identified APECs for the listed COPC prior to Site redevelopment or change to a more sensitive land use as required.

5.1 Limiting Conditions, QP Statement and QP Signature

5.1.1 Limiting Conditions

CIMA+ completed diligent and reasonable research in the conduct of this evaluation, with respect to the recognized laws and standards of practice.

The facts presented in this report are strictly limited to the period of investigation. The conclusions presented in this report are based on the available information and documents, the observations made during the Site visit and the information obtained from communications with various contacts. The interpretation presented in this report is limited to this data.

CIMA+ is not responsible for erroneous conclusions due to voluntary abstention or the non-availability of pertinent information. Any opinion expressed in relation to legal or regulatory conformity is technical and should not be, in any case, considered as legal advice.

CIMA+ has prepared this report for the sole use of the client. Any use of this report by a third party, as any decision based on this report, is the singular responsibility of the third party. **CIMA+** will not be held responsible for eventual damages towards a third party resulting from decisions taken, or based, on this report.

5.1.2 Statement and Signature of the Qualified Person

The Phase One ESA for the Phase One Property as detailed in this report has been conducted by or under the supervisions of a Qualified Person as defined in O.Reg 153/04, as amended. Assessor Qualifications are provided in **Appendix E**.

CIMA+

Karen Greer, M.Sc., P.Geo., QP_{ESA}

Senior Hydrogeologist

6. References

City of Kawartha Lakes, Maps and Apps, Property and Planning, Lindsay, Ontario, https://geohub-kawartha.hub.arcgis.com/, 2023

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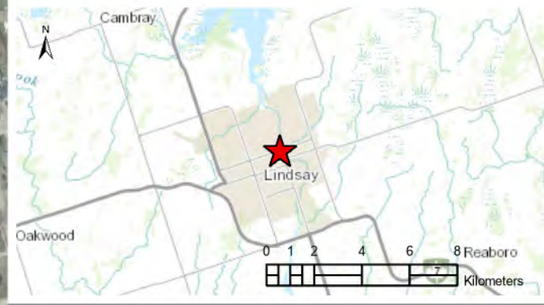
A

Appendix A
Figures

Site
250 m - Study Area



Spatial Reference:
Name: NAD 1983 CSRS MTM 10
PCS: NAD 1983 CSRS MTM 10
GCS: GCS North American 1983 CSRS
Map Units: Meter
Scale: 1:4,200

Sources:
- Basemap : © OpenStreetMap (and) contributors, CC-BY-SA, City of Kawartha Lakes, Region of Durham, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan

General Notes:
Dimensions on the plan should be read and not measured.
Any errors or omissions should be reported to CIMA +. The boundaries, areas, and title deeds must be verified by a surveyor.

Figure 1 - Site Location Map

Phase One Environmental Site Assessment - Detailed Design of the Colborne Street Bridge
Lindsay, ON
The Corporation of the City of Kawartha Lakes

Ref # : B001592-300-353

Survey by : -
Figure by : J. Scott
Concept by : J. Scott
Verified by : M. Klein

Site

250 m - Study Area

Physiography

Till Plains (Drumlinized)

Surficial Geology

5b: Stone-poor, carbonate-derived silty to sandy till

Spatial Reference:
Name: NAD 1983 CSRS MTM 10
PCS: NAD 1983 CSRS MTM 10
GCS: GCS North American 1983 CSRS
Map Units: Meter
Scale: 1:4,200

Sources:
- Ontario Geological Survey 2010. Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 128 – Revised.
- Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release— Data 228.
- Basemap : © OpenStreetMap (and) contributors, CC-BY-SA, City of Kawartha Lakes, Region of Durham, Ontario Base Map, Province of Ontario, Ontario MNR, Esri Canada, Esri, © OpenStreetMap

General Notes:
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Figure 2 - Surficial Geology & Physiography Map

Phase One Environmental Site Assessment - Detailed Design of the Colborne Street Bridge
Lindsay, ON
The Corporation of the City of Kawartha Lakes

Ref # : B001592-300-353

Survey by : -
Figure by : J. Scott
Concept by : J. Scott
Verified by : M. Klein

Revision 00 - - Issued for report - May 3, 2023 11:04:20

Site

250 m - Study Area

Bedrock Geology

54a: Limestone, dolostone, shale, arkose, sandstone

Spatial Reference:
Name: NAD 1983 CSRS MTM 10
PCS: NAD 1983 CSRS MTM 10
GCS: GCS North American 1983 CSRS
Map Units: Meter
Scale: 1:4,200

Sources:

- Ontario Geological Survey 2011. 1:25,000 scale - bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release—Data 126 – Rev 1.
- Basemap : © OpenStreetMap (and) contributors, CC-BY-SA, City of Kawartha Lakes, Region of Durham,

General Notes:

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Figure 3 - Bedrock Geology Map

Phase One Environmental Site Assessment - Detailed Design of the Colborne Street Bridge
Lindsay, ON
The Corporation of the City of Kawartha Lakes

Ref # : B001592-300-353

Survey by : -
Figure by : J. Scott
Concept by : J. Scott
Verified by : M. Klein

- Site
- 250 m - Study Area
- Well Record Locations

Spatial Reference:
Name: NAD 1983 CSRS MTM 10
PCS: NAD 1983 CSRS MTM 10
GCS: GCS North American 1983 CSRS
Map Units: Meter
Scale: 1:3,700

Sources:
- Well Records Locations, WWIS, 2023
- Basemap : © OpenStreetMap (and) contributors, CC-BY-SA, City of Kawartha Lakes, Region of Durham, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS,

General Notes:
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Any errors or omissions should be reported to CIMA +. The boundaries, areas, and title deeds must be verified by a surveyor.

Figure 4 - Well Records Location Map

Phase One Environmental Site Assessment - Detailed Design of the Colborne Street Bridge
Lindsay, ON
The Corporation of the City of Kawartha Lakes

Ref # : B001592-300-353

Survey by : -
Figure by : J. Scott
Concept by : J. Scott
Verified by : M. Klein

Site
250 m - Study Area

Areas of Potential Environmental Concern (APEC)

APEC A
APEC B
APEC C

18 Electricity Generation, Transformation and Power Stations

28 Gasoline and Associated Products Storage in Fixed Tanks

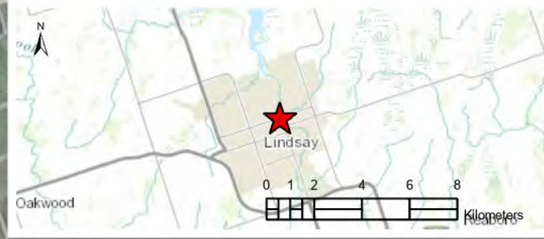
34 Metal Fabrication

46 Rail Yards, Tracks, and Spurs

54 Textile Manufacturing and Processing

58 Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners

59 Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products



Spatial Reference:
Name: NAD 1983 CSRS MTM 10
PCS: NAD 1983 CSRS MTM 10
GCS: GCS North American 1983 CSRS
Map Units: Meter
Scale: 1:3,700

Sources:
- Basemap : © OpenStreetMap (and) contributors, CC-BY-SA, City of Kawartha Lakes, Region of Durham, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan

General Notes:
Dimensions on the plan should be read and not measured.
Any errors or omissions should be reported to CIMA +. The boundaries, areas, and title deeds must be verified by a surveyor.

Figure 5 - Conceptual Site Model (CSM)

Phase One Environmental Site Assessment - Detailed Design of the Colborne Street Bridge
Lindsay, ON
The Corporation of the City of Kawartha Lakes

Ref # : B001592-300-353

Survey by : -
Figure by : S. Scott
Concept by : S. Scott
Verified by : M. Klein

B

Appendix B
Environmental Source Information

ERIS

CITY DIRECTORY

Project Property:	*Colborne Street Bridge* *n/a* *Kawartha Lakes,ON*
Project No:	*B001592*
Requested By:	*CIMA+*
Order No:	*23041400415*
Date Completed:	*May 10, 2023*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

May 10, 2023
RE: CITY DIRECTORY RESEARCH
n/a
Kawartha Lakes,ON

Thank you for contacting ERIS for an City Directory Search for the site described above. Our staff has conducted a reverse listing City Directory search to determine prior occupants of the subject site and adjacent properties. We have provided the nearest addresses(s) when adjacent addresses are not listed. If we have searched a range of addresses, all addresses in that range found in the Directory are included.

Note: Reverse Listing Directories generally are focused on more highly developed areas. Newly developed areas may be covered in the more recent years, but the older directories will tend to cover only the "central" parts of the city. To complete the search, we have either utilized the ACPL, Library of Congress, State Archives, and/or a regional library or history center as well as multiple digitized directories. These do not claim to be a complete collection of all reverse listing city directories produced.

ERIS has made every effort to provide accurate and complete information but shall not be held liable for missing, incomplete or inaccurate information. To complete this search we used the general range(s) below to search for relevant findings. If you believe there are additional addresses or streets that require searching please contact us at 866-517-5204.

Search Criteria:
99 of Lindsay Street North
140 of William Street North
Search Notes:
Lindsay is last listed in 1925.

Search Results Summary

Date	Source	Comment
2021	DIGITAL BUSINESS DIRECTORY	
2017	DIGITAL BUSINESS DIRECTORY	
2012	DIGITAL BUSINESS DIRECTORY	
2001/02	VERNONS	
1995/96	VERNONS	
1991	VERNONS	
1985	VERNONS	
1981	VERNONS	
1975	VERNONS	
1972	VERNONS	
1939	VERNONS	
1936	VERNONS	
1929	VERNONS	
1925/26	VERNONS	

2021 LINDSAY STREET NORTH

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2021 WILLIAM STREET NORTH

SOURCE: DIGITAL BUSINESS DIRECTORY

140 **REVERA WILLIAM PLACE RETIRE**...*RETIREMENT PLANNING SERVICES*
140 **REVERA WILLIAM PLACE RETIRE**...*NON-PROFIT ORGANIZATIONS*

2017 LINDSAY STREET NORTH

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2017 WILLIAM STREET NORTH

SOURCE: DIGITAL BUSINESS DIRECTORY

140 **WILLIAM PLACE**...*CONTINUING CARE RETIREMENT COMMUNITIES*
140 **WILLIAM PLACE RETIRE RSDNC**...*NURSING CARE FACILITIES*
140 **WILLIAM PLACE RETIREMENT**...*CONTINUING CARE RETIREMENT COMMUNITIES*

2012 LINDSAY STREET NORTH

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2012 WILLIAM STREET NORTH

SOURCE: DIGITAL BUSINESS DIRECTORY

140 **WILLIAM PLACE RETIREMENT...** *CONTINUING CARE RETIREMENT COMMUNITIES*

2001/02 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

2001/02 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **APARTMENTS**
140 **RESIDENCE ON WILLIAM STREET**

1995/96 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1995/96 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **ALZHEIMERS SOCIETY VICTORIA COUNTY**
140 **APARTMENTS**
140 **RESIDENCE ON WILLIAM STREET**

1991 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1991 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **APARTMENTS**

1985 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1985 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **ADDRESS NOT LISTED**

1981 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1981 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **ADDRESS NOT LISTED**

1975 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **SYLVESTER STEEL PRODUCTS COMPANY LIMITED (RAILWAY EQUIP)**

1975 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **VACANT**

1972 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **SYLVESTER STL PROD CO LTD**

1972 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **AB'S ESSO SERV**

1939 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1939 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **ADDRESS NOT LISTED**

1936 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1936 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **ADDRESS NOT LISTED**

1929 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1929 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **ADDRESS NOT LISTED**

1925/26 LINDSAY STREET NORTH

SOURCE: VERNONS

99 **ADDRESS NOT LISTED**

1925/26 WILLIAM STREET NORTH

SOURCE: VERNONS

140 **ADDRESS NOT LISTED**

opta
INFORMATION INTELLIGENCE

enviroscan

An SCM Company

175 Commerce Valley Drive W
Markham, Ontario L3T 7Z3

T: 905-882-6300
W: www.optaintel.ca

Report Completed By:

Stephanie

Site Address:

Kawartha Lakes ON

Project No:

23041400415

Opta Order ID:

126628

Requested by:

Eleanor Goolab
Ecolog Eris

Date Completed:

4/21/2023 9:27:38 AM

Project Name: Colborne Street Bridge

Project #: 23041400415
P.O. #: B001592

ENVIROSCAN Report

Search Area: Kawartha Lakes ON

Requested by:
Eleanor Goolab
Date Completed: 04/21/2023 09:27:38

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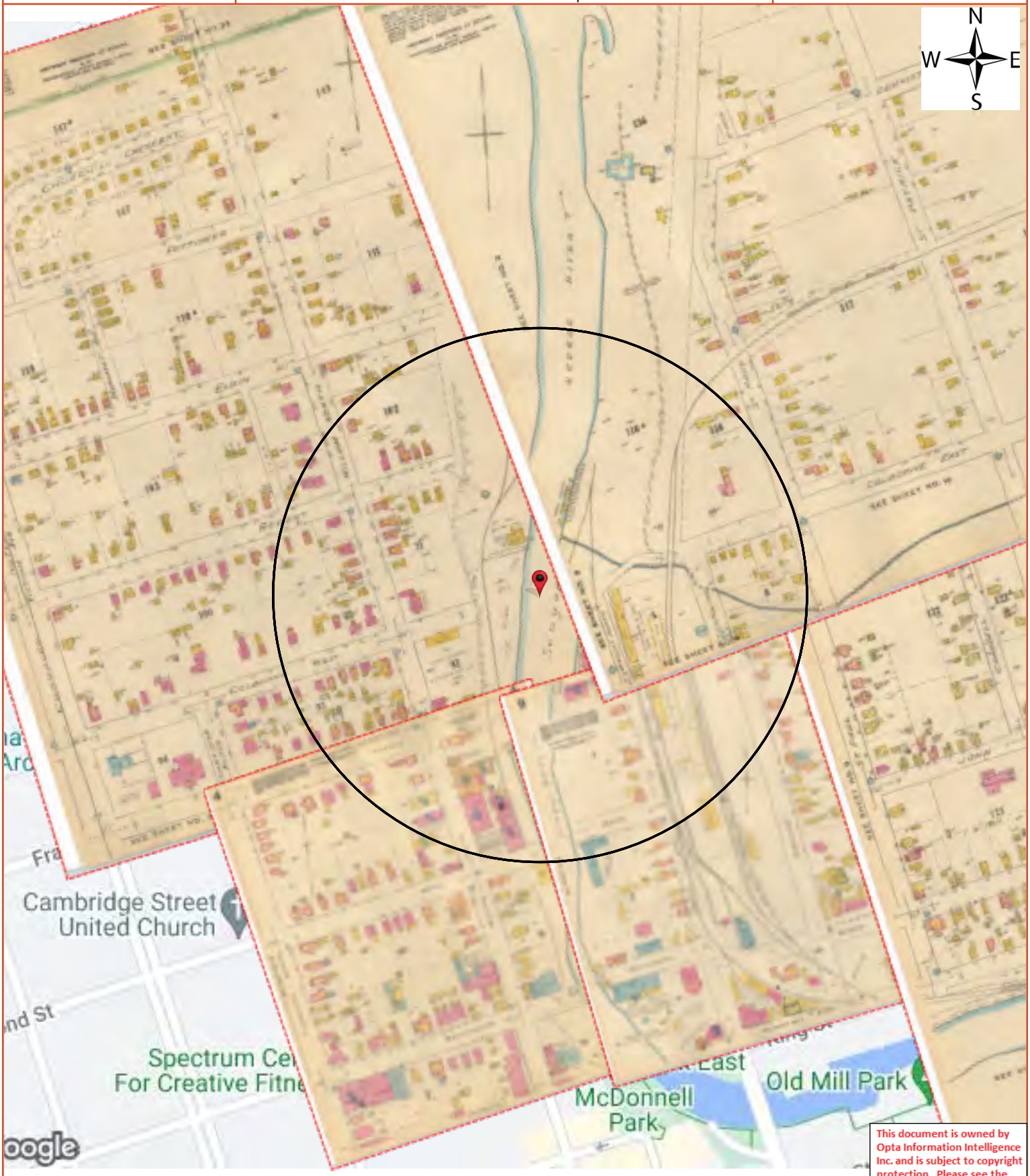
OPTA INFORMATION INTELLIGENCE



Opta Historical Environmental Services Enviroscan™ Terms and Conditions

Report

The documents (hereinafter referred to as the "Documents") to be released as part of the report (hereinafter referred to as the "Report") to be delivered to the purchaser as set out above are documents in Opta's records relating to the described property (hereinafter referred to as the "Property"). Opta makes no representations or warranties respecting the Documents whatsoever, including, without limitation, with respect to the completeness, accuracy or usefulness of the Documents, and does not represent or warrant that these are the only plans and reports prepared in association with the Property or in Opta's possession at the time of Report delivery to the purchaser. The Documents are current as of the date(s) indicated on them. Interpretation of the Documents, if any, is by inference based upon the information which is apparent and obvious on the face of the Documents only. Opta does not represent, warrant or guarantee that interpretations other than those referred to do not exist from other sources. The Report will be prepared for use by the purchaser of the services as shown above hereof only.

Disclaimer

Opta disclaims responsibility for any losses or damages of any kind whatsoever, whether consequential or other, however caused, incurred or suffered, arising directly or indirectly as a result of the services (which services include, but are not limited to, the preparation of the Report provided hereunder), including but not limited to, any losses or damages arising directly or indirectly from any breach of contract, fundamental or otherwise, from reliance on Opta Reports or from any tortious acts or omissions of Opta's agents, employees or representatives.

Entire Agreement

The parties hereto acknowledge and agree to be bound by the terms and conditions hereof. The request form constitutes the entire agreement between the parties pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, negotiations and discussions, whether oral or written, and there are no representations or warranties, or other agreements between the parties in connection with the subject matter hereof except as specifically set forth herein. No supplement, modification, waiver, or termination of the request shall be binding, unless confirmed in writing by the parties hereto.

Governing Document

In the event of any conflicts or inconsistencies between the provisions hereof and the Reports, the rights and obligations of the parties shall be deemed to be governed by the request form, which shall be the paramount document.

Law

This agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein.

ENVIROSCAN Report

Report Index

Requested by:
Eleanor Goolab
Date Completed: 04/21/2023 09:27:38

OPTA INFORMATION INTELLIGENCE

Project Name: Colborne Street Bridge

Project #: 23041400415
P.O. #: B001592

ENVIROSCAN Report

1911 Volume: Lindsay Firemap: 2
Lindsay Plan: 1073 (1898)
Sheet: 2 (1911)

Requested by:
Eleanor Goolab
Date Completed: 04/21/2023 09:27:38

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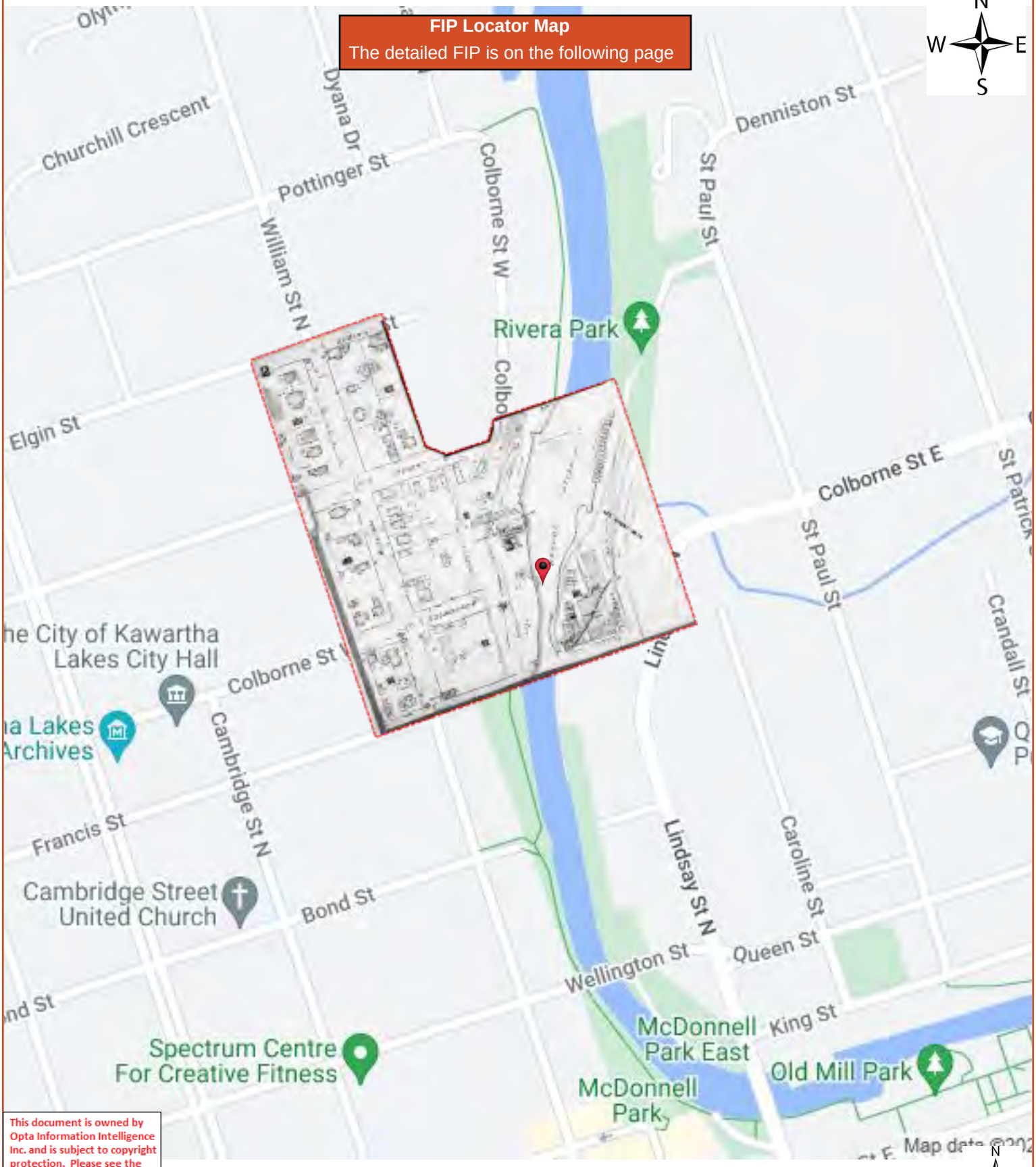
OPTA INFORMATION INTELLIGENCE

FIP Locator Map
The detailed FIP is on the following page



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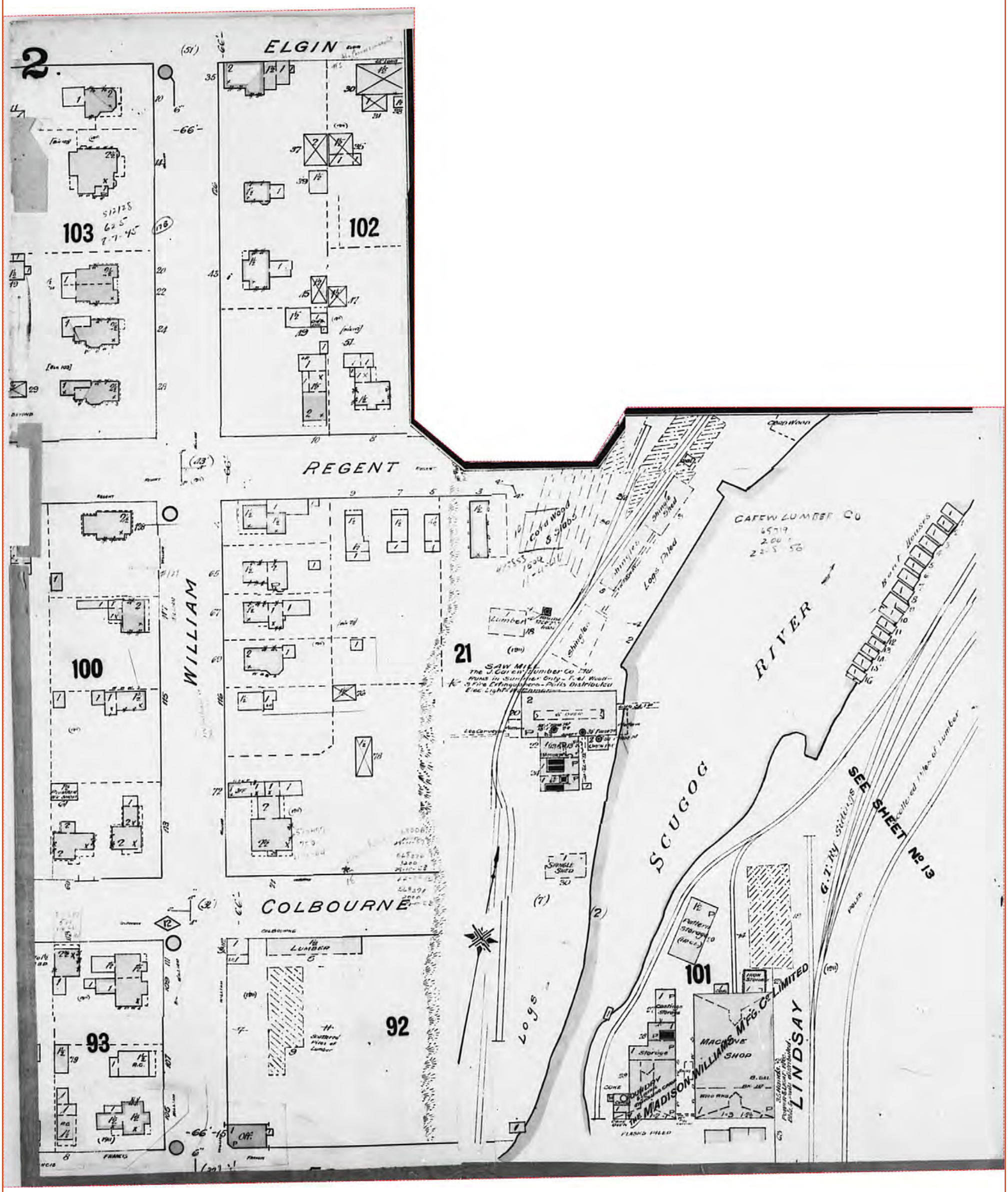

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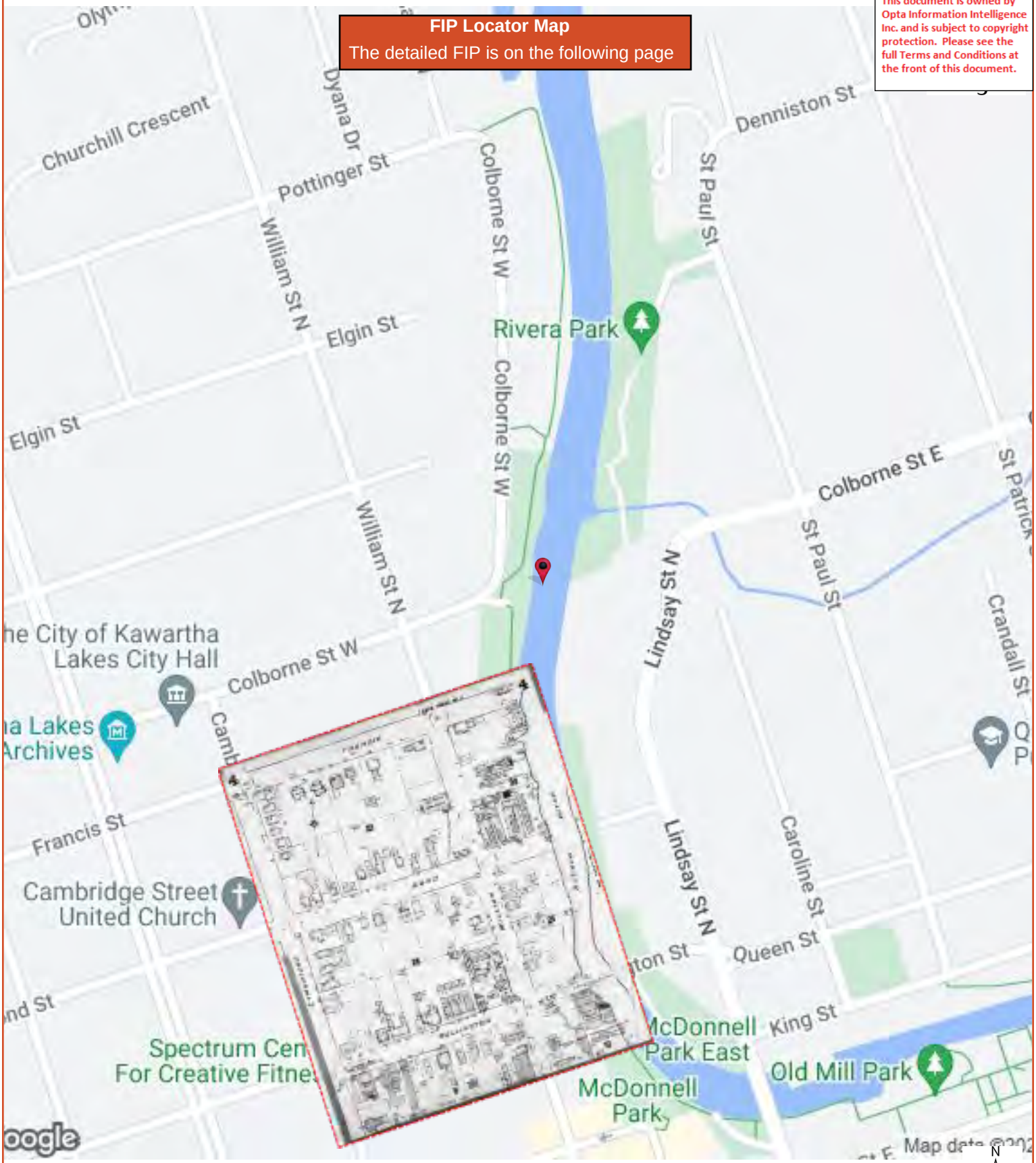

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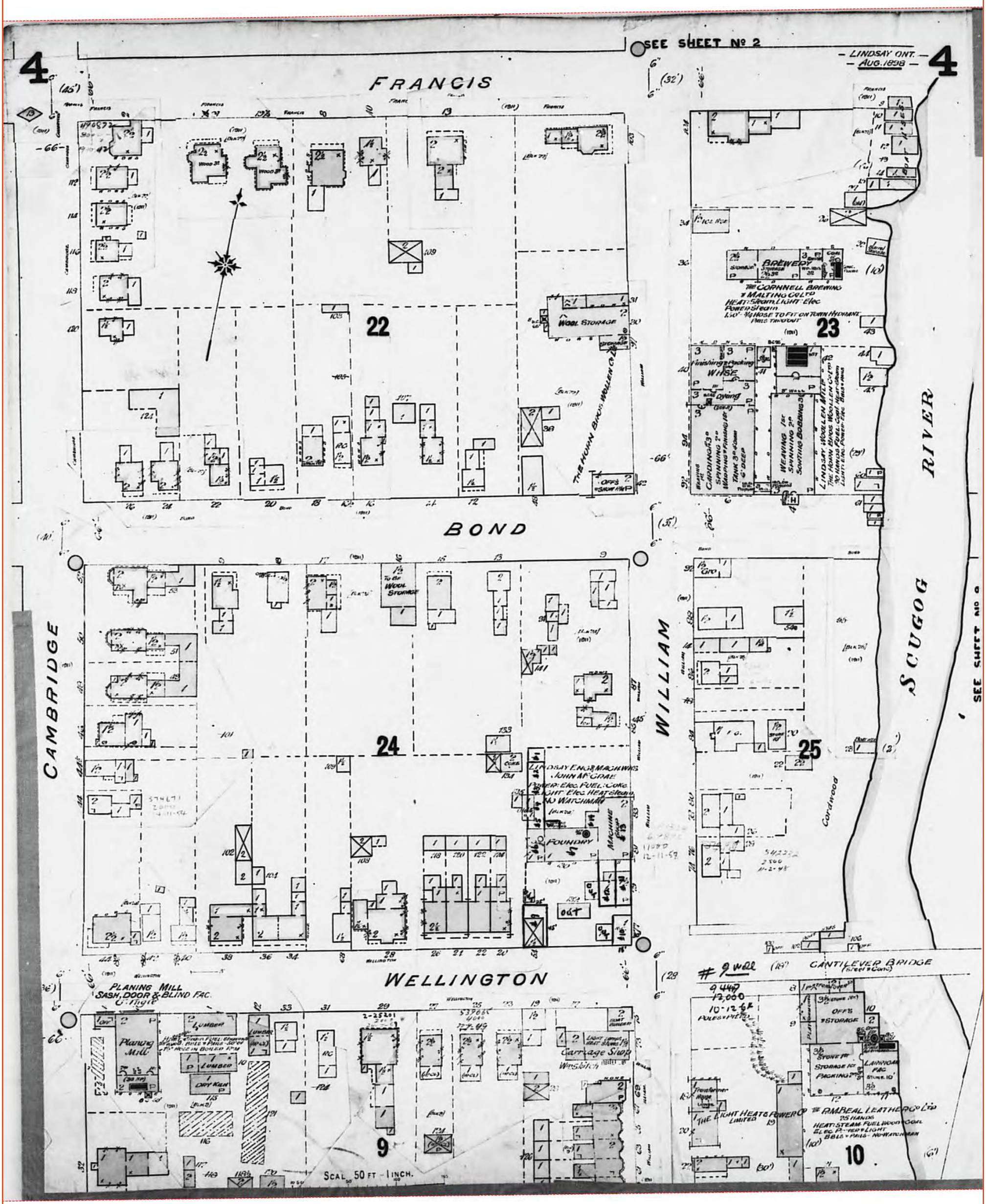

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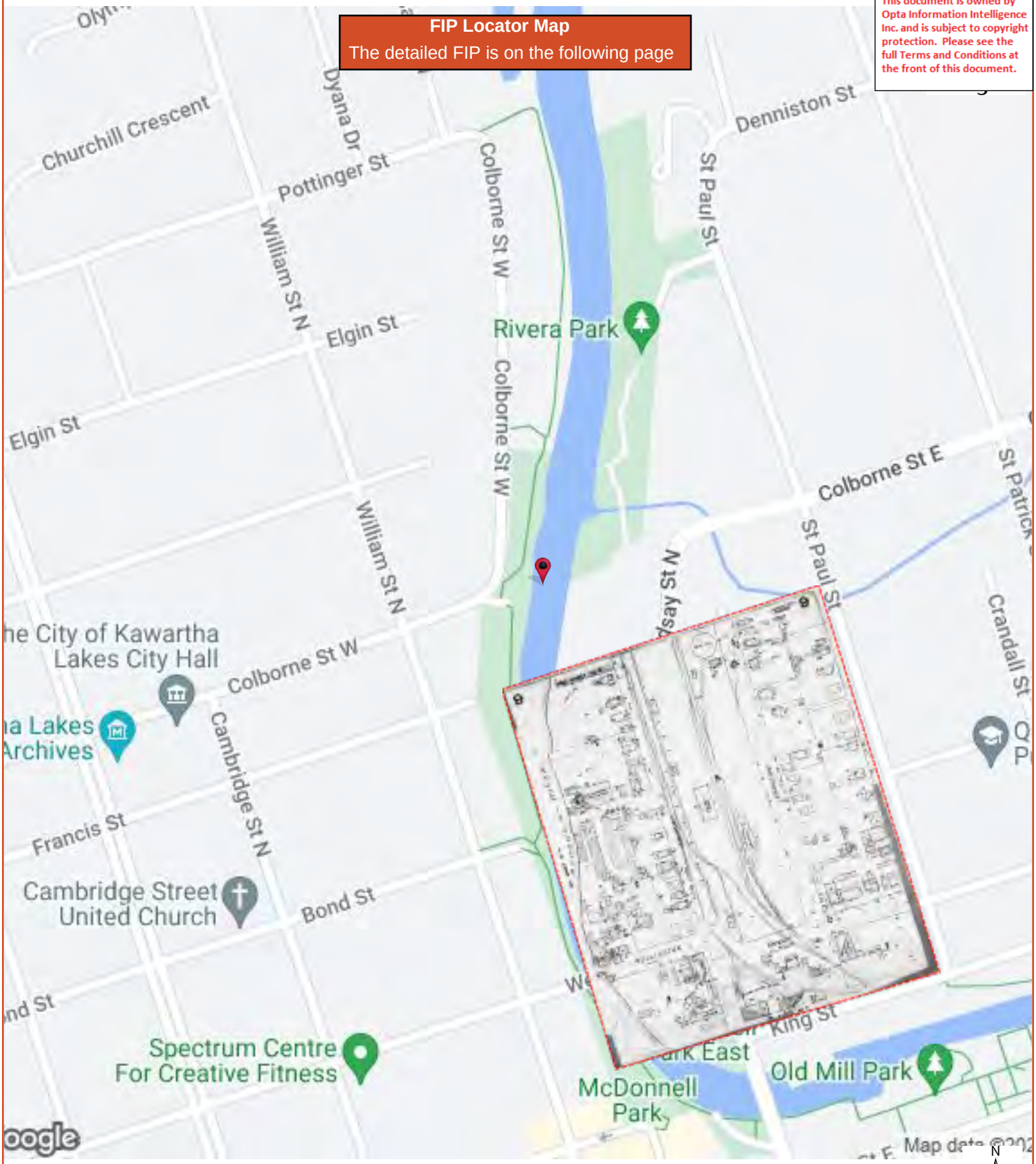

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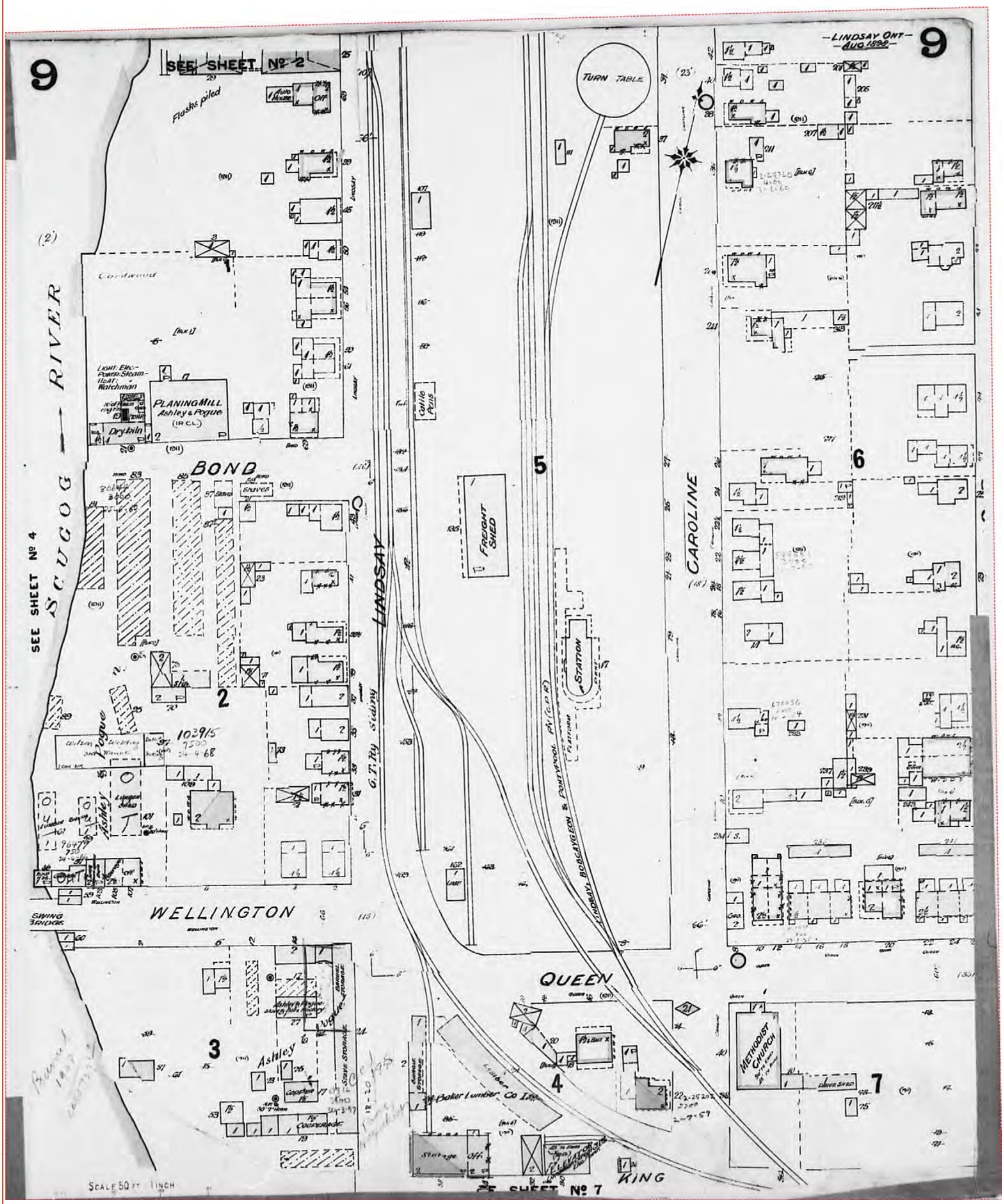

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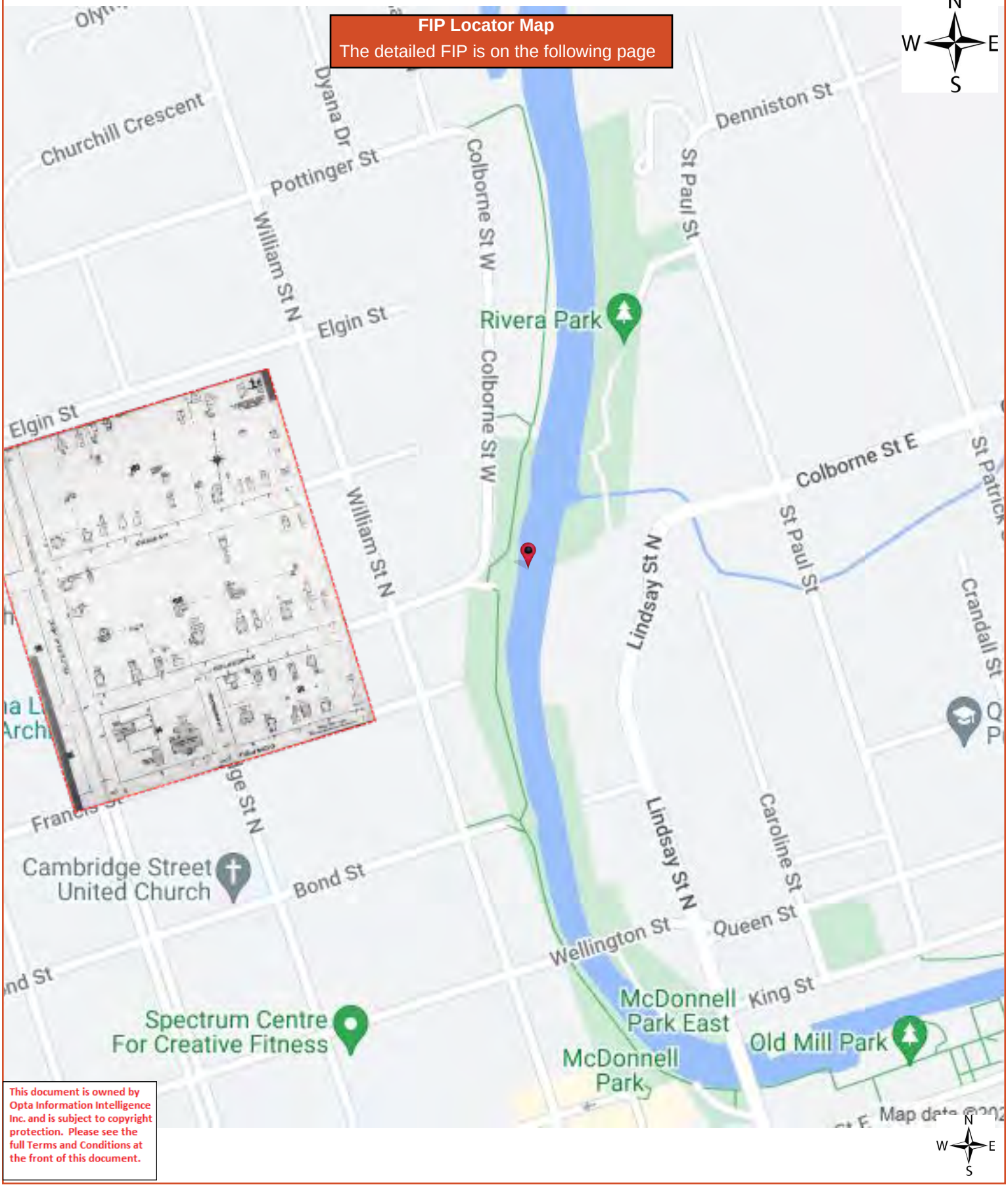

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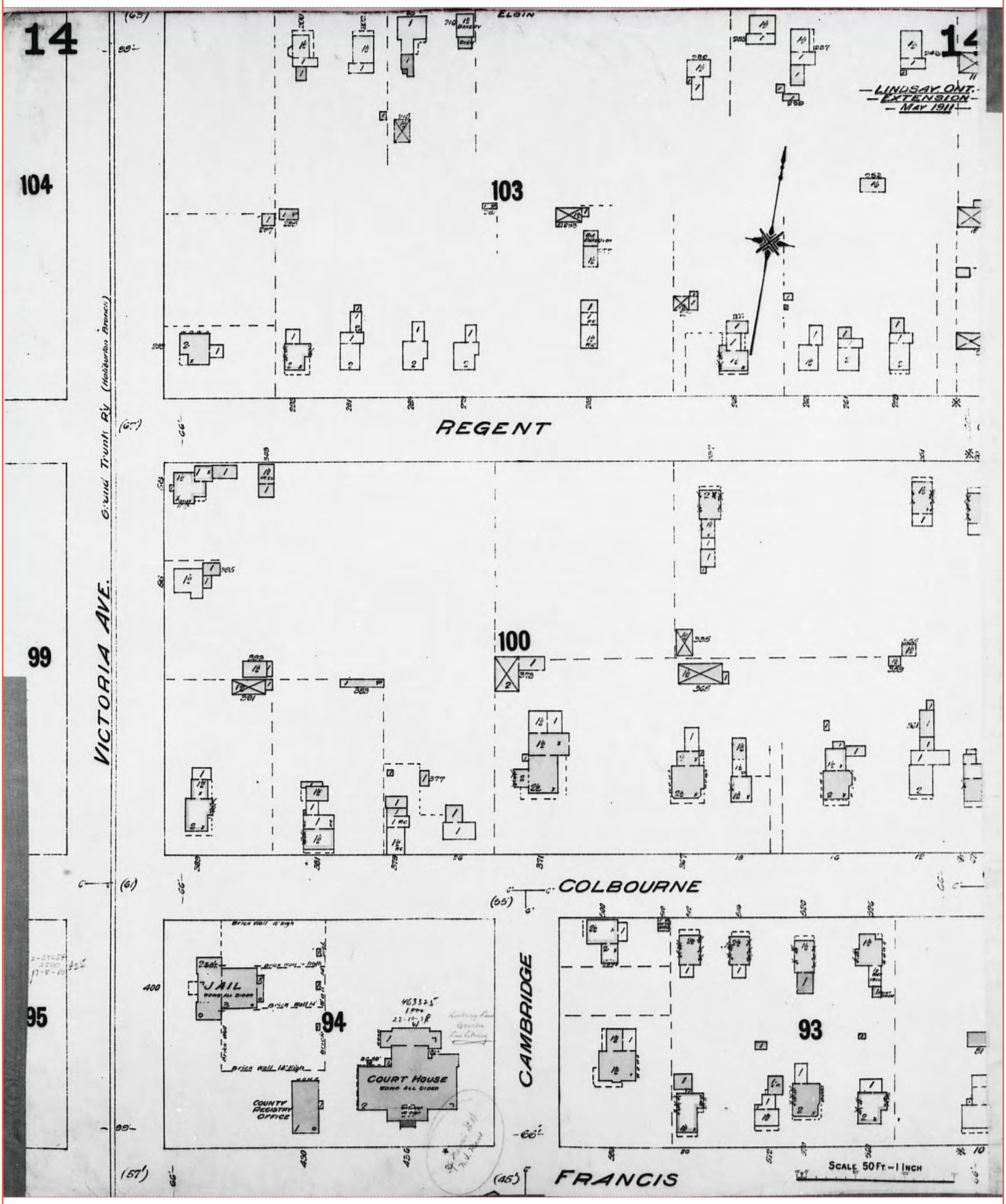

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Project #: 23041400415
P.O. #: B001592

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Lindsay Plan: 1077 (1949)
Sheet: 2 (1949)

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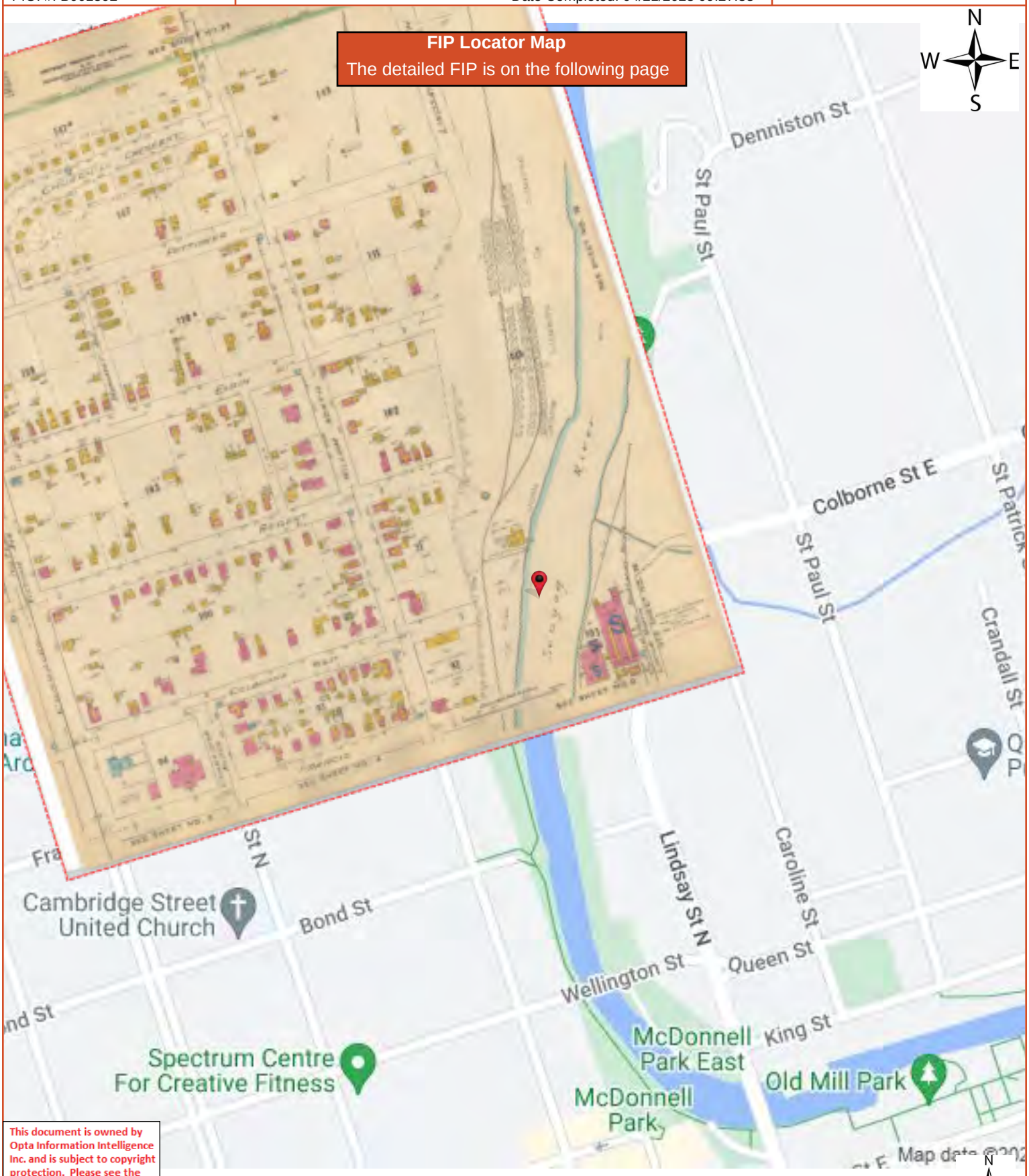

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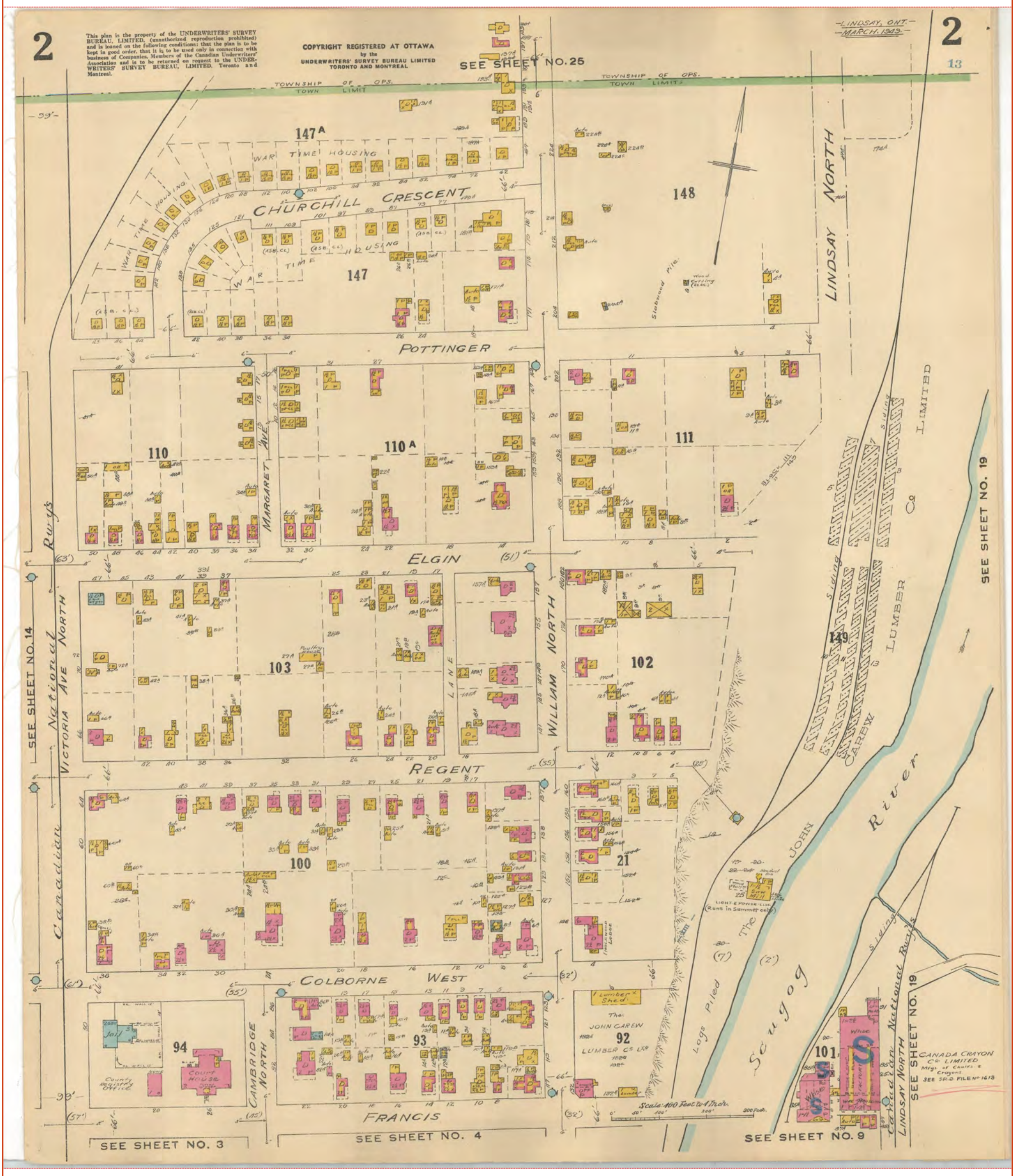
Sheet: 2 (1949)



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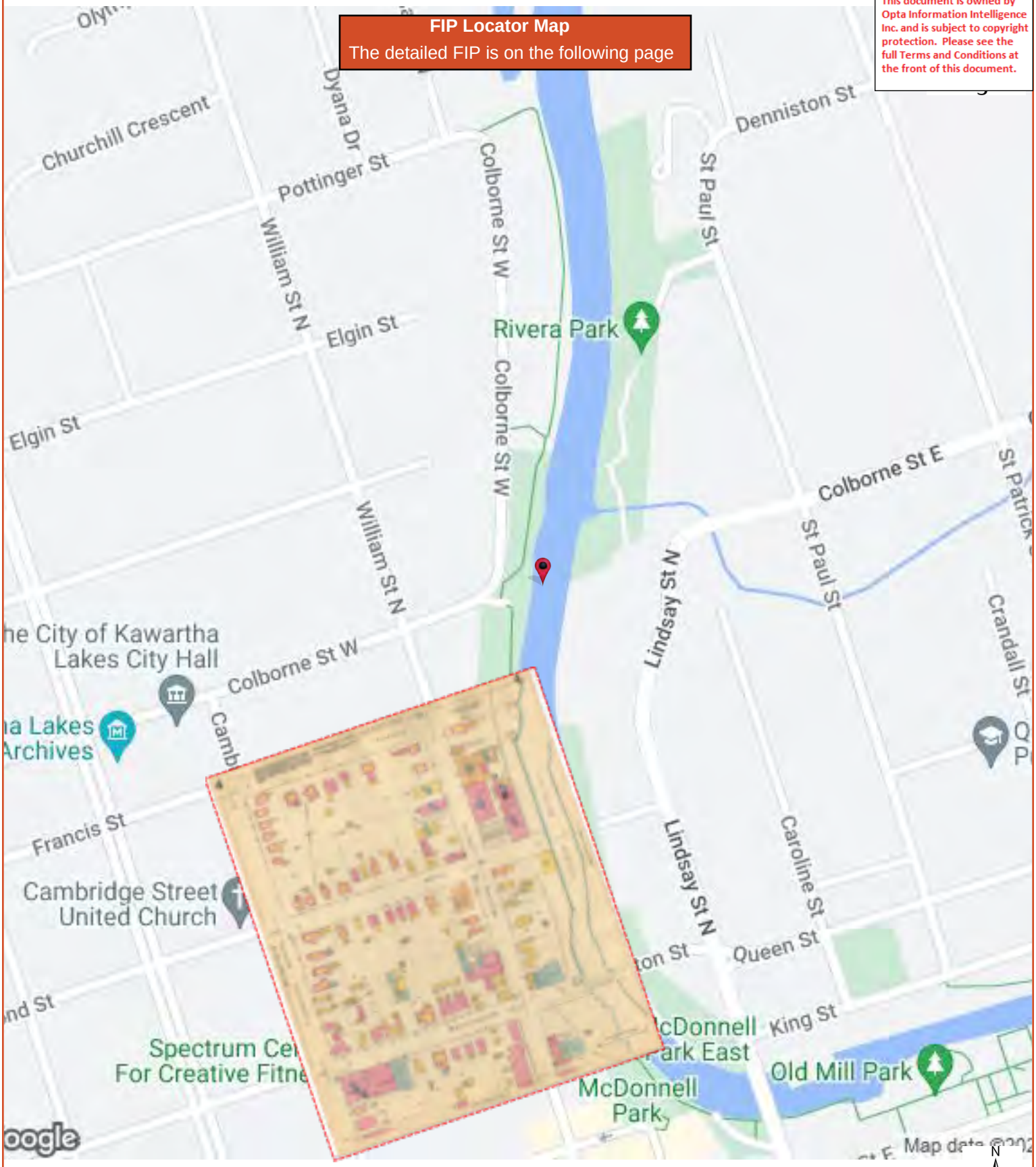

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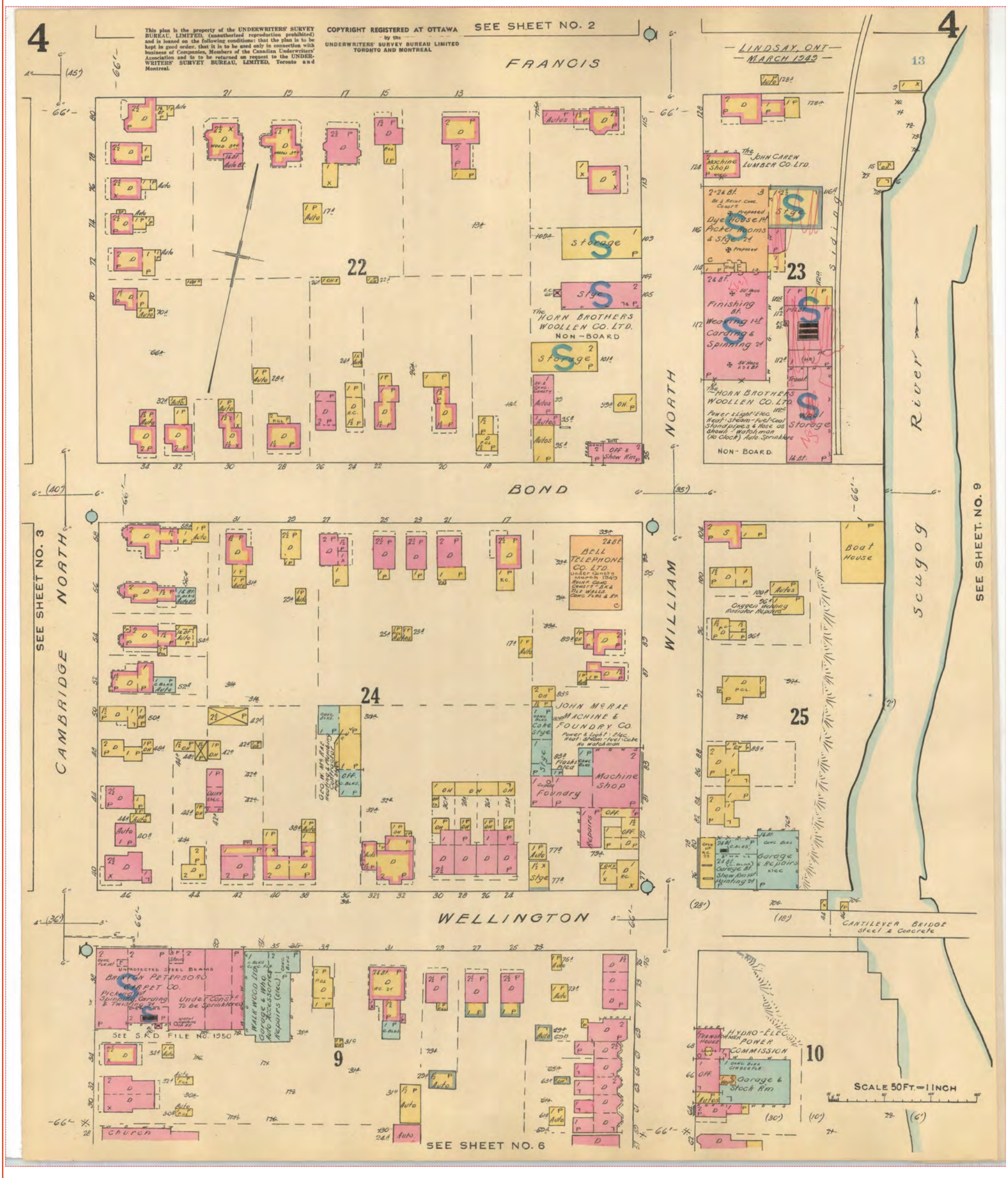

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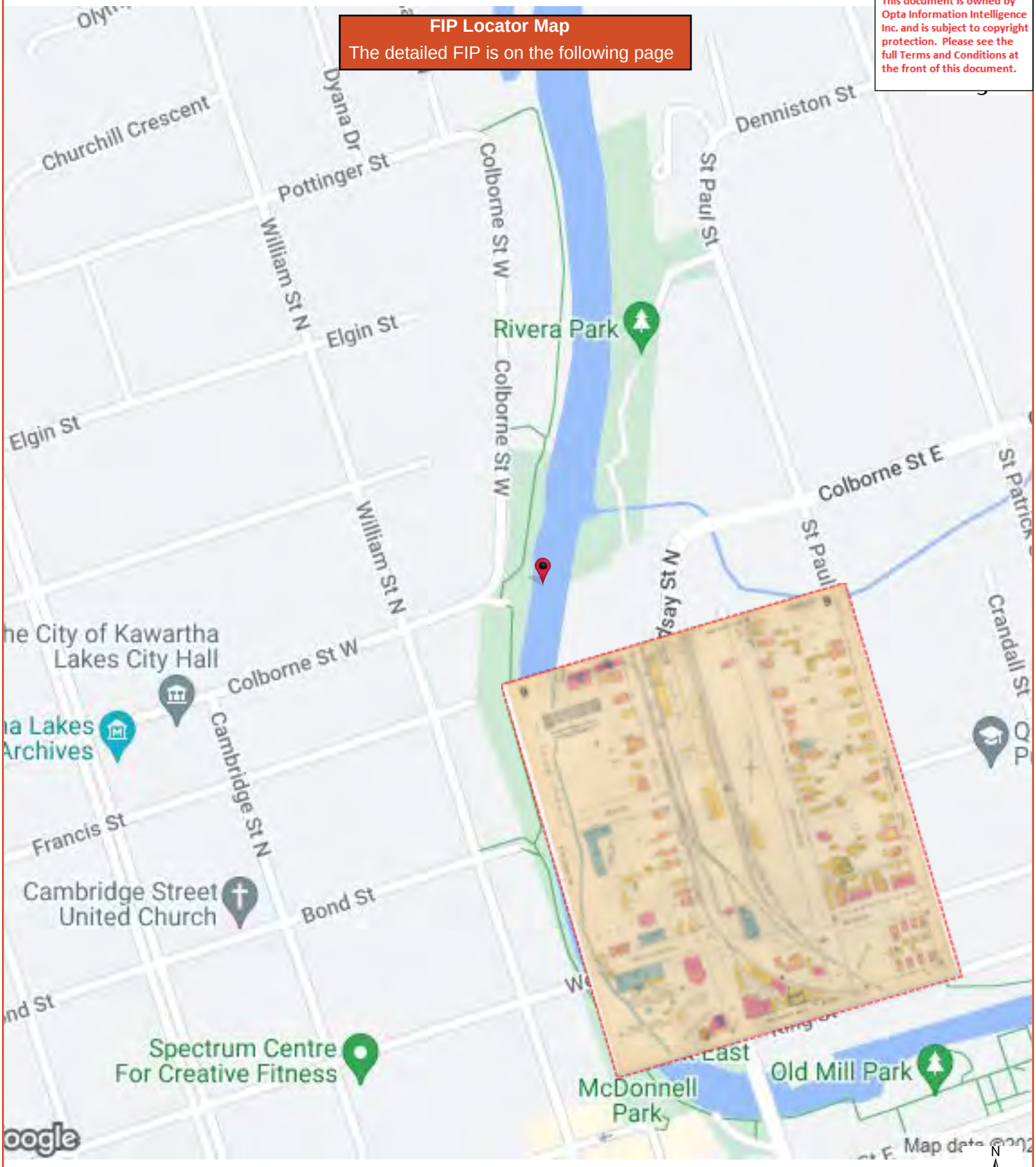

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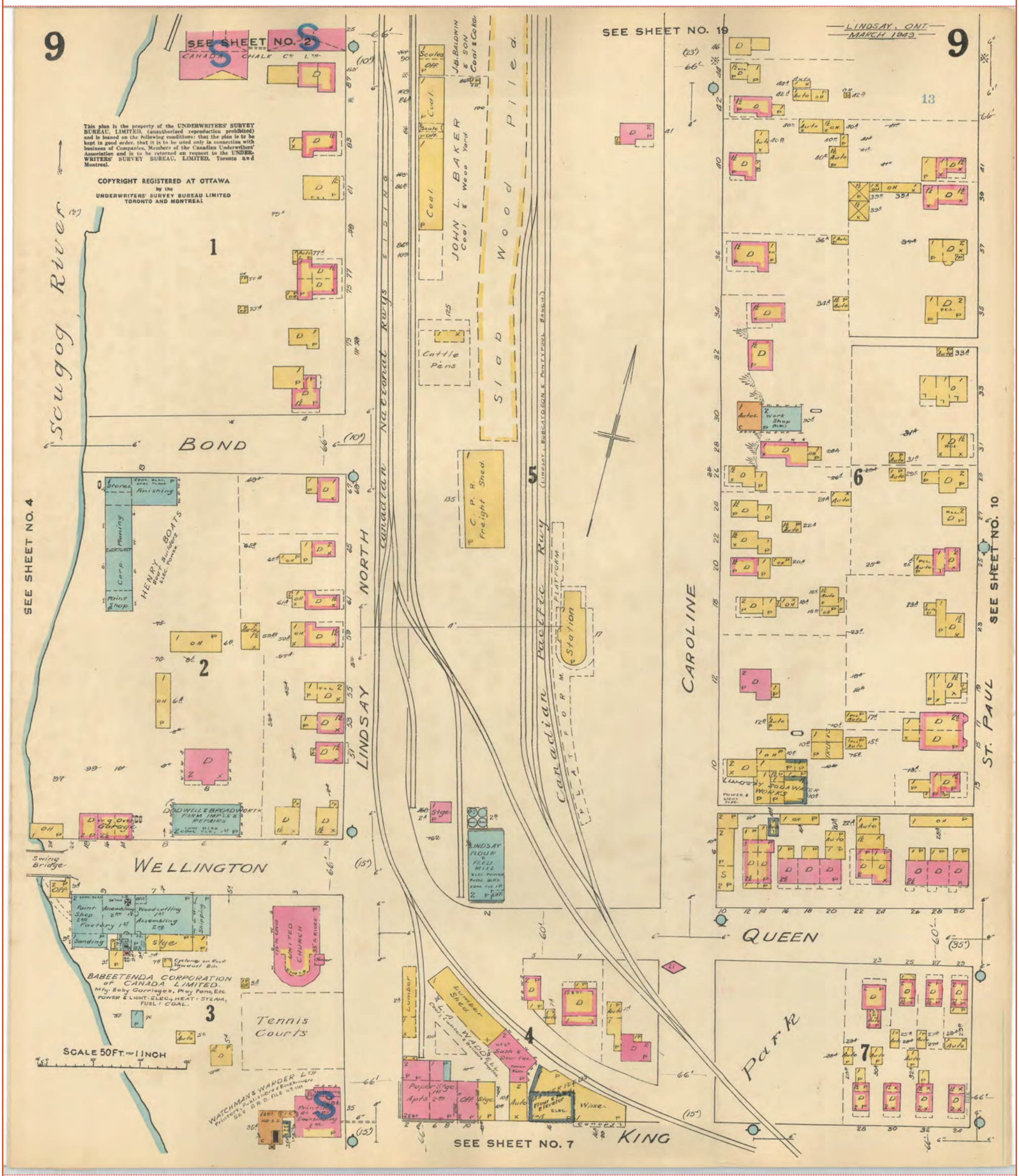

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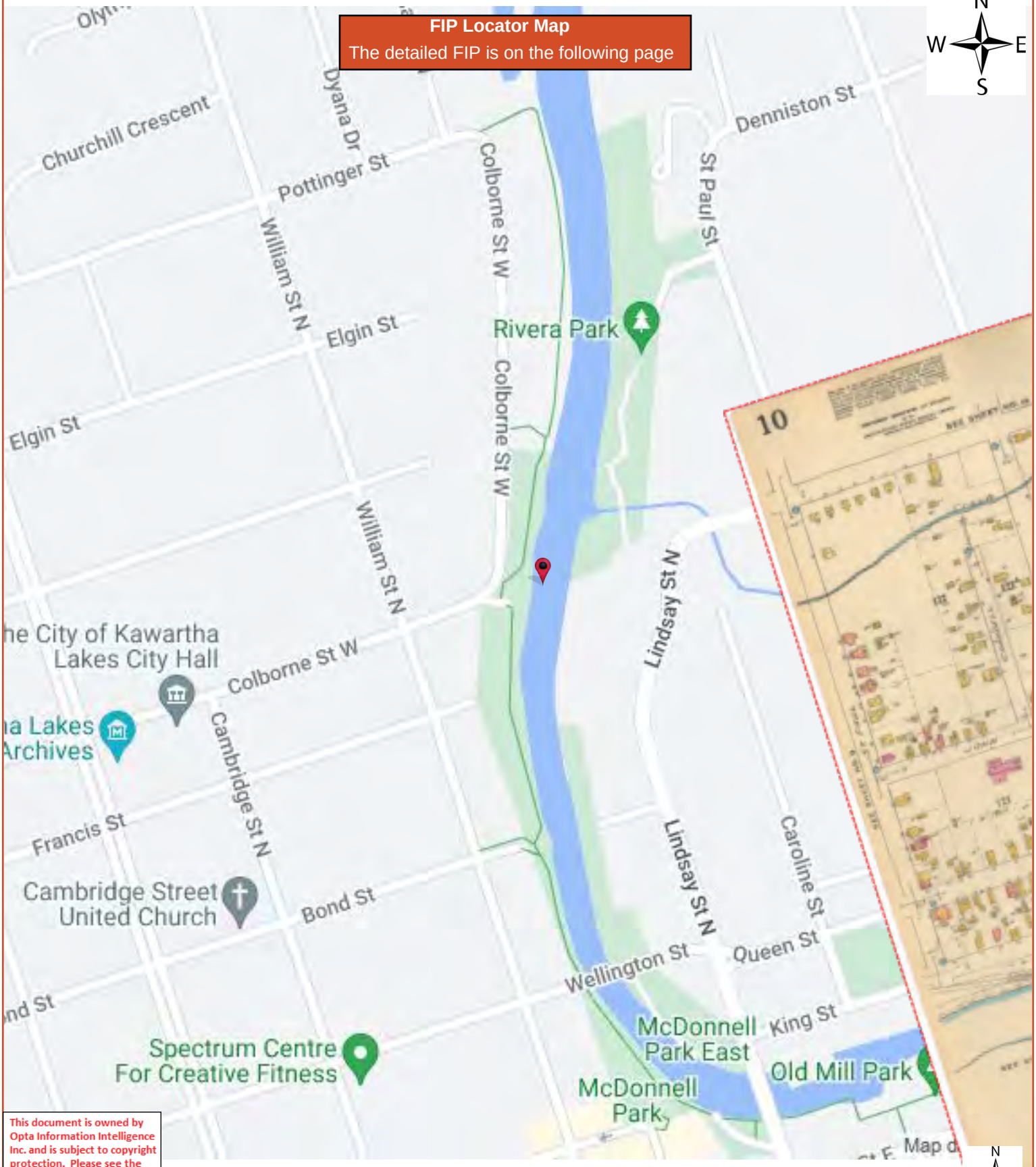

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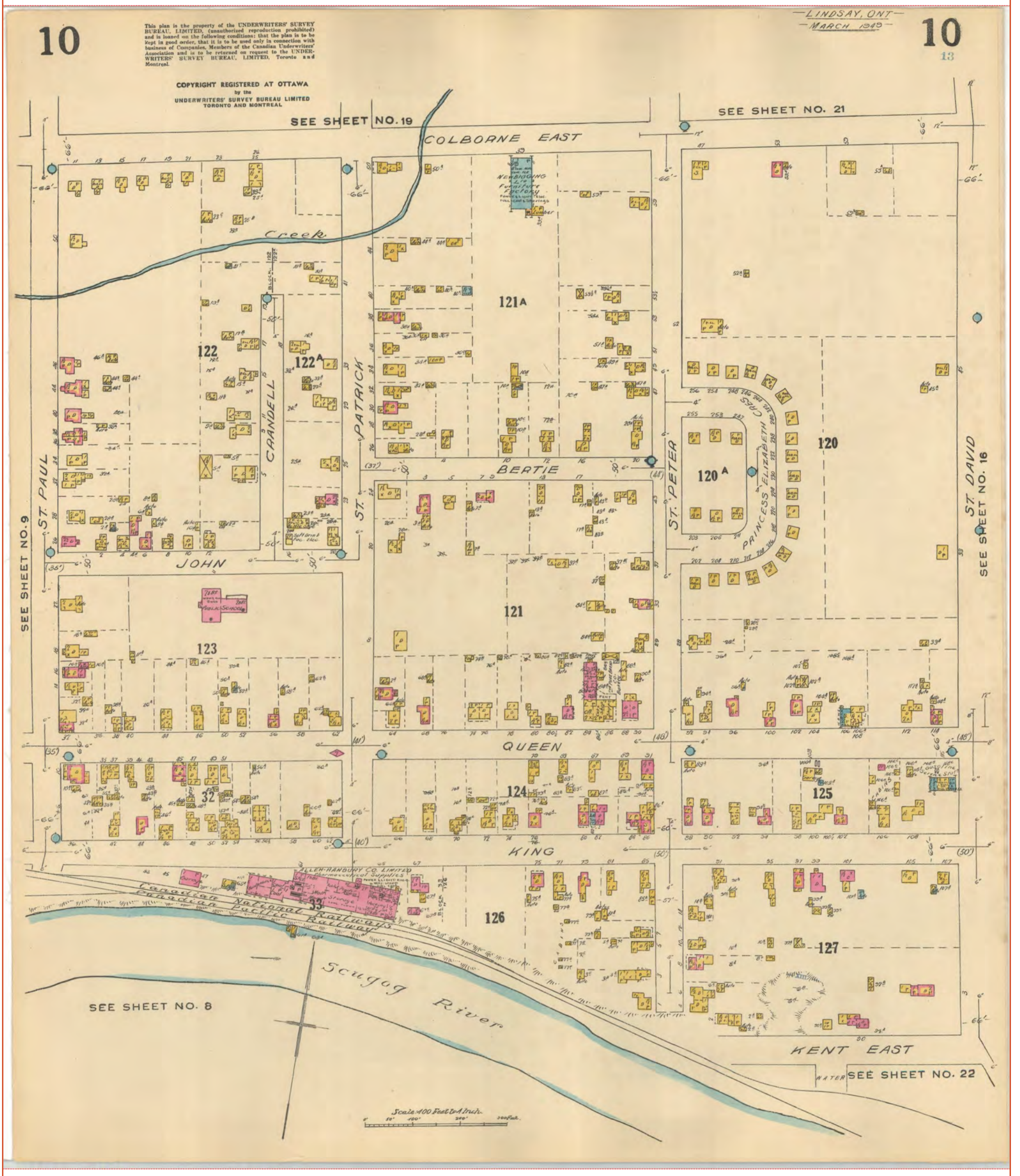

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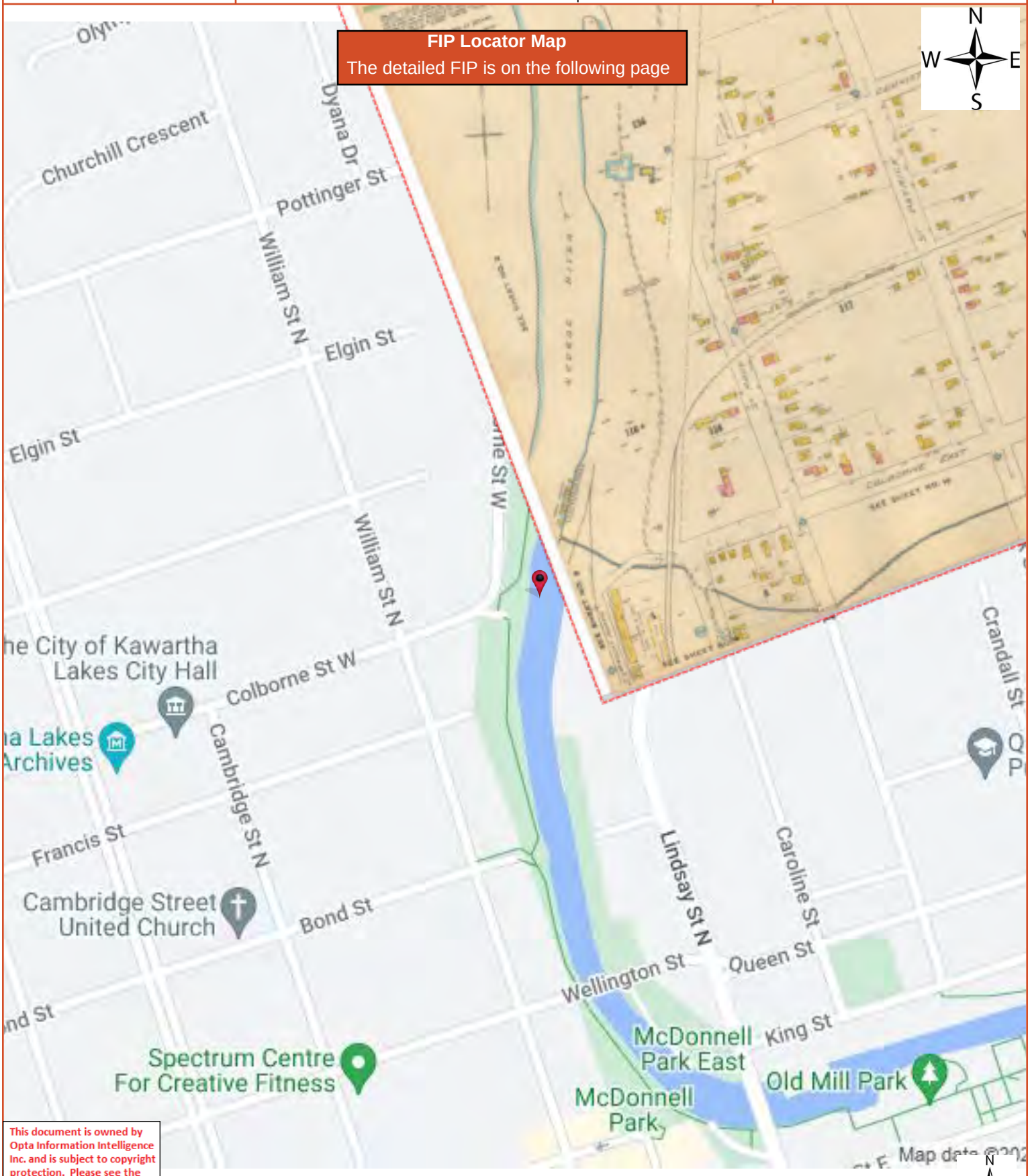

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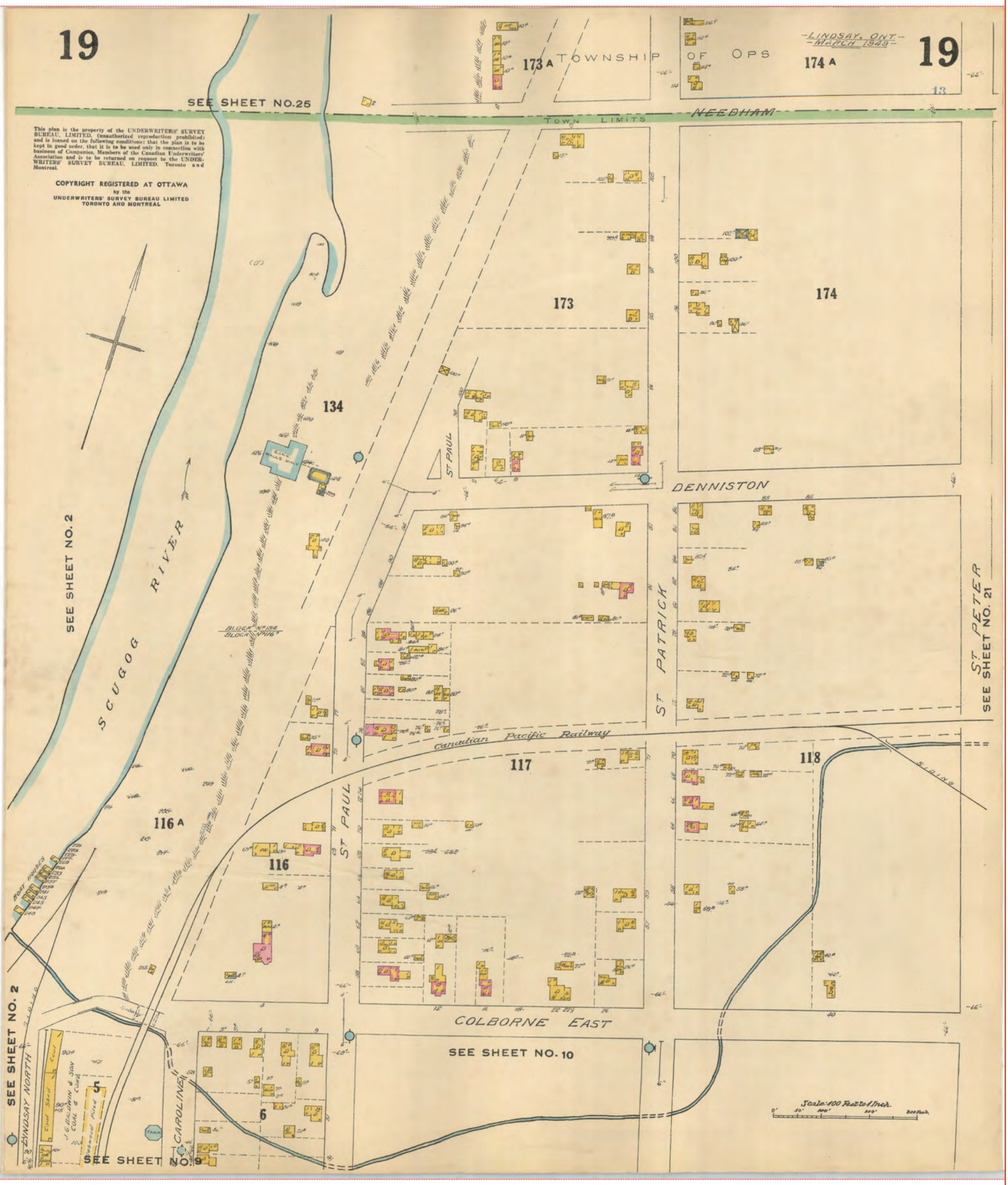


Ministry of the Environment, Conservation and Parks

Access and Privacy Office

12th Floor
40 St. Clair Avenue West
Toronto ON M4V 1M2
Tel: (416) 314-4075

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Bureau de l'accès à l'information et de la protection de la vie privée

12e étage
40, avenue St. Clair ouest
Toronto ON M4V 1M2
Tél. : (416) 314-4075

Ontario

June 2, 2023

Jamieson-Lee Scott
CIMA+
1400 Blair Towers Place
Ottawa, Ontario K1J 9B8
jamieson-lee.scott@cima.ca

Dear Jamieson-Lee Scott:

RE: MECP FOI A-2023-02328, Your Reference #: B001592 – Record Release Letter

This letter is further to your request made pursuant to the Freedom of Information and Protection of Privacy Act (the Act) relating to 140 William Street North, Lindsay.

Attached is a copy of the records.

If you have any questions, please contact Mai Tang at 437-996-8412 or Mai.Tang@ontario.ca.

Yours truly,

Mai for

Ryan Gunn
Manager (A), Access and Privacy Office

Attachment

Generator Details

Registration/Notification Number

ON9823784

Legal Company Name

Primary Name:	REVERA INC.	Division Name:	NA

Company Operating Name

Primary Name:	REVERA INC.	Division Name:	NA

Mailing Address

Division Building:	NA	Post Box Number:	NA
Address Line 1:	55 STANDISH COURT 8TH FLOOR	Address Line 2:	NA
Town/City:	MISSISSAUGA	Postal Code / Zip Code:	L5R 4B2
County: (if inside Ontario)	PEEL (R. M.)	Province/State (If inside Canada/US)	ONTARIO
County: (if outside Ontario)	NA	Province / State (If outside Canada / US)	NA
Country:	Canada		

Site Location

This should be the street address of the site that is being registered. You are required to register each site that generates hazardous waste separately.

Division Building:	NA	Post Box Number:	NA
Address Line 1:	140 WILLIAM STREET NORTH		
Address Line 2:	NA		
Town/City:	LINDSAY	Postal Code / Zip Code:	K9V 5R4
County: (if inside Ontario)	PETERBOROUGH	Province / State (If inside Canada / US)	ONTARIO
County: (if outside Ontario)	NA	Province / State (If outside Canada / US)	NA
Country:	Canada		

Company Name: **REVERA INC.**
Company Number: **ON9823784 (Generator)**

Active Waste Classes

Active Waste Class Listing

Add New Waste Class Inactive waste classes

Active On-site Waste Classes

Waste Class	View Details	Hazardous Waste Number (per waste stream)	Reg. 347 Schedules	Disposal Method	Part 2B required	Part 2B complete	Physical State	Off-Site	Status
150 - L	View Details	N/A					Liquid	Off-Site	Active

Back

Ministry of the Environment, Conservation and Parks

Sector Compliance Branch

INSPECTION REPORT

William Place
140 William Street North
Kawartha Lakes, ON, K9V 5R4
District Office: Peterborough

Inspection Completion Date: Oct 30, 2013

Company Information

Company Identification

Company Name:
Lindsay Facility Inc.

Business Identification Number:

Business Name:

Company Address

Street Address, Unit Identifier:
140 William Street North

District Office
Peterborough

Municipality Type:
Kawartha Lakes (City)

County/District:

Province:
ON

Postal Code:
K9V 5R4

Company Mailing Address

Same As Company: No

Street Address, Unit Identifier:
140 William Street North

City:
Kawartha Lakes

Province/State:
ON

Postal Code:
K9V 5R4

Country:
Canada

Inspection Information

Inspection Report: 1-J550W **Pass/Fail:** Pass

Incident Report Reference Number (IRRN): 0377-9D2JC7

Inspection Report Summary

On Wednesday October 30, 2013, Provincial Officer P. Copland of the Sector Compliance Branch - Ministry of the Environment, conducted an inspection of William Place Retirement Residence, multi-unit retirement residential building located at 140 William Street North., City of Kawartha Lakes. (Lindsay)
The purpose of the inspection was to ensure that the multi-unit residential buildings were operating in accordance with Ontario Regulation 103/94. O. Reg. 103/94 requires the source separation for the purpose of reuse or recycling of the following materials: aluminum food or beverage cans, glass bottles and jars for food or beverage, newsprint, polyethylene terephthalate bottles for food or beverage, steel food or beverage cans, as well as the categories of waste collected or accepted by the blue box waste management system of the municipality where the building is located.
Officer Copland met with DOAS Alana Sisson on site.
In a conversation with the representative it was indicated that the building contains 74 units. There were adequate recycling receptacles provided in several areas as well as in the outside waste storage area for the collection of paper products (newsprint, fine paper, cardboard, box board, magazines, styrofoam), as well as receptacles for the collection of container material (steel food/beverage cans, aluminum food/beverage cans, glass food/beverage cans). All cardboard and wastes are picked up by BFI Inc. twice per month. The remaining recycling is placed at curbside and picked up by the City of Kawartha Lakes.
At the time of the inspection the site was found to be in compliance with regulation 103/94. No further action required.

Site Information

Site Identification

Site Name:
William Place

District Office:
Peterborough

Contact Name:
Alana Sisson

Contact Phone:
7053281016

Site Address

Street Address, Unit Identifier:
140 William Street North

Municipality Type:
Kawartha Lakes (City)

County/District:

Province:
ON

Postal Code:
K9V 5R4

Site Mailing Address

Same As Site Address: Yes

Street Address, Unit Identifier:
140 William Street North

City:
Lindsay

Province/State:
ON

Postal Code:
K9V 5R4

Country:
Canada

Inspection Team

Inspection Role	Officer Name	Officer Badge Number
Primary Officer	Paul Copland	1171
Supervisor	Rick Lalonde	899

Field Inspection Observations

Checklist Name: ICI-MUR-HEALTH & ENVIRONMENTAL IMPACT - Generic

Observation:	Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?		
Observation Type:	Impact	Response:	No
Comments/Findings:	There was no indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate.		
Observation:	Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material?		
Observation Type:	Impact	Response:	No
Comments/Findings:	There was no indication of a known or anticipated environmental impact during the inspection and/or review of relevant material.		
Observation:	Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment?		
Observation Type:	Impact	Response:	No
Comments/Findings:	There was no indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment.		
Observation:	Was there any indication of a potential for a human health impact or environmental impairment during the inspection and/or the review of relevant material?		
Observation Type:	Impact	Response:	No
Comments/Findings:	There was no indication of a potential for a human health impact or environmental impairment during the inspection and/or the review of relevant material.		

Recommended Actions

None

This Inspection Report does not in any way suggest that there is or has been compliance with all applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements.

Sign-Off

Primary Officer **Paul Copland** **Badge Number** **1171**

Date ----------

Signature ----------

We want to hear from you. Please tell us about the quality of your interaction with our staff.
You can provide feedback at 1-888-745-8888.

Ontario

Ministry of the Environment
Ministère de l'Environnement

INCIDENT REPORT

Reference Number:	0377-9D2JC7	**File Storage Number:**	1-J550W
Module:	Incident Reporting	**Module Type:**	Pro-Active
Cross Reference:	(doc link)	**Task Link:**	0603-9D2JX6
Originating Document:		**Created by:**	Paul L Copland
Incident Report Reference Number:		0377-9D2JC7	
Date Created:	2013/11/01	**Date Completed:**	2013/11/28
Bring Forward Date:		**Bring Forward Reason:**	
Status:	Closed		
Program	Waste - Solid/Non-hazardous	**Activity:**	SCB Inspection

Is this an **air emission** (measured or modelled) or **wastewater** (sewage) **discharge exceedance** that will become part of the Environmental Compliance Report?

(legislation, certificate of approval, order, or guideline)

○ Yes ● No ○ To be determined *Click here for Guidance*

Caller or PO Information

Reported By:		
First Name	**Last Name**	
Paul L	Copland	

Contact Mailing Address

Municipality:		
Kawartha Lakes		

Reported By:	

MOE Information

Date & Time Reported to MOE:	2013/11/01 09:45		
Office Receiving Incident Report:	Sector Compliance Branch		
Incident Info Received By:	Paul L Copland		
MOE Response:	Planned Field Response	**Site Region:**	Eastern
Date & Time of MOE Arrival at Scene:			
Master Incident Report Number:			
SAC Action Class:			
Non-Standard Procedure:	No		
ERP Call-out Initiated:			

Client(s)

Client Details

Lindsay Facility Inc, Business/Facility Name: William Place Retirement Residence
Mailing Address: 140 William St N, Kawartha Lakes, Ontario, Canada, K9V 5R4
Physical Address: 140 William St N, Kawartha Lakes, City, Ontario, Canada, K9V 5R4
Telephone: (705)328-1016
Client #: 7487-9D2JQ5, Client Type: Corporation

Site(s)

Site Details

William Place Retirement Residence
Address: 140 William St N, Kawartha Lakes, City, K9V 5R4
District Office: Peterborough
Site #: 0778-9D2JV5

Incident Information

Incident Summary:	SCB Pro-active inspection, reg 103/94-Source Separation *cannot be longer than 60 characters*
Incident Description:	On Wednesday October 30, 2013 Officer Copland inspected William Place Retirement Residence for compliance under Reg 103/94-Source Separation. Please see attached CAMEO report for further details.

Links & Comments:	
Attachments Names:	WilliamPlace.pdf

Date & Time of Incident	**Incident Date Confirmation?** Actual 2013/10/30		
Source Type:		**Sector Type:**	
Nearest Watercourse:		**Watershed Category Code:**	
Environmental Impact:			
Nature of Impact:			
Incident Event:		**Incident Reason:**	
Damaged Party:	No		

Contaminants Table

Contaminant Name	Code	UN#	Limit	Quantity	[units]	[freq]

Controller of Material:		**Owner of Material:**	
Estimated Clean Up Cost:		**Who Cleaned Up:**	
% Clean Up:	%	**MOE/Other Agencies**	

		Involved:	

Voluntary / Mandatory Abatement

Is there Voluntary Abatement Activity?	○ Yes	● No	○ To be determined

Voluntary / Mandatory Compliance Items

Type	Parent RefNo	Work Summary (may be truncated)	Date	AttainList

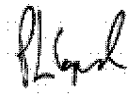
Offence(s)

Suspected Violation(s)/Offence(s):	
Act - Regulation - Section, Description {General Offence}	

Provincial Officer:

Name: Paul L Copland
Badge No:

Work Unit: Unit 2
District/Area Office: Sector Compliance Branch
Date: 2013/11/01

Signature: 

Supervisor:

Name: Rick Lalonde

Work Unit: Unit 2
District/Area Office: Sector Compliance Branch
Date: 2013/11/28

Signature:

Ontario Ministry of the Environment

Sector Compliance Branch

INSPECTION REPORT

William Place
140 William Street North
Kawartha Lakes, ON, K9V 5R4
District Office: Peterborough

Inspection Completion Date: Oct 30, 2013

Company Information

Company Identification

Company Name	Business Identification Number	Business Name
Lindsay Facility Inc.		

Company Address

Street Address, Unit Identifier		District Office	
140 William Street North		Peterborough	
Municipality (Type)	**County/District**	**Province**	**Postal Code**
Kawartha Lakes (City)		ON	K9V 5R4

Company Mailing Address

Same As Company No

Street Address, Unit Identifier		City
140 William Street North		Kawartha Lakes
Province/State	**Postal Code**	**Country**
ON	K9V 5R4	Canada

Inspection Information

Inspection Report 1-J550W **Pass/Fail** **PASS**

Incident Report Reference Number (IRRN): 0377-9D2JC7

Inspection Report Summary

On Wednesday October 30, 2013, Provincial Officer P. Copland of the Sector Compliance Branch - Ministry of the Environment, conducted an inspection of William Place Retirement Residence, multi-unit retirement residential building located at 140 William Street North., City of Kawartha Lakes. (Lindsay)

The purpose of the inspection was to ensure that the multi-unit residential buildings were operating in accordance with Ontario Regulation 103/94. O. Reg. 103/94 requires the source separation for the purpose of reuse or recycling of the following materials: aluminum food or beverage cans, glass bottles and jars for food or beverage, newsprint, polyethylene terephthalate bottles for food or beverage, steel food or beverage cans, as well as the categories of waste collected or accepted by the blue box waste management system of the municipality where the building is located. Officer Copland met with DOAS Alana Sisson on site.

In a conversation with the representative it was indicated that the building contains 74 units. There were adequate recycling receptacles provided in several areas as well as in the outside waste storage area for the collection of paper products (newsprint, fine paper, cardboard, box board, magazines, styrofoam), as well as receptacles for the collection of container material (steel food/beverage cans, aluminum food/beverage cans, glass food/beverage cans). All cardboard and wastes are picked up by BFI Inc. twice per month. The remaining recycling is placed at curbside and picked up by the City of Kawartha Lakes.

At the time of the inspection the site was found to be in compliance with regulation 103/94. No further action required.

Site Information

Site Identification

Site Name
William Place

District Office
Peterborough

Contact Name : Alana Sisson

Contact Phone # : (705) 328-1016

Site Address

Street Address, Unit Identifier
140 William Street North

Municipality (Type)	County/District	Province	Postal Code
Kawartha Lakes (City)		ON	K9V 5R4

Site Mailing Address

Same As Site Address: Yes

Inspection Team

Inspection Role	Officer Name	Officer Badge Number
Primary Officer	Paul Copland	1171
Supervisor	Peter Balaban	444

Recommended Actions

None

This Inspection Report does not in any way suggest that there is or has been compliance with all applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements.

Sign-Off

Primary Officer **PAUL COPLAND** **Badge Number** **1171**

Date _____

Signature _____

DATABASE REPORT

Project Property:	*Colborne Street Bridge* *n/a* *Kawartha Lakes ON*
Project No:	*B001592*
Report Type:	*Quote - Custom-Build Your Own Report*
Order No:	*23041400415*
Requested by:	*CIMA+*
Date Completed:	*April 14, 2023*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Table of Contents

Executive Summary

Property Information:

Project Property:	*Colborne Street Bridge* *n/a Kawartha Lakes ON*
Project No:	*B001592*

Order Information:

Order No:	*23041400415*
Date Requested:	*April 14, 2023*
Requested by:	*CIMA+*
Report Type:	*Quote - Custom-Build Your Own Report*

Historical/Products:

City Directory Search	*CD - Subject Site*
ERIS Xplorer	*ERIS Xplorer*
Insurance Products	*Fire Insurance Maps/Inspection Reports/Site Plans*
Land Title Search	*Current Land Title Search*

Executive Summary: Report Summary

Database	Name	Searched	Project Property	Boundary to 0.25km	Total
AAGR	Abandoned Aggregate Inventory	Y	0	0	0
AGR	Aggregate Inventory	Y	0	0	0
AMIS	Abandoned Mine Information System	Y	0	0	0
ANDR	Anderson's Waste Disposal Sites	Y	1	1	2
AST	Aboveground Storage Tanks	Y	0	0	0
AUWR	Automobile Wrecking & Supplies	Y	0	0	0
BORE	Borehole	Y	0	0	0
CA	Certificates of Approval	Y	1	1	2
CDRY	Dry Cleaning Facilities	Y	0	0	0
CFOT	Commercial Fuel Oil Tanks	Y	0	0	0
CHEM	Chemical Manufacturers and Distributors	Y	0	0	0
CHM	Chemical Register	Y	0	0	0
CNG	Compressed Natural Gas Stations	Y	0	0	0
COAL	Inventory of Coal Gasification Plants and Coal Tar Sites	Y	0	0	0
CONV	Compliance and Convictions	Y	0	0	0
CPU	Certificates of Property Use	Y	0	0	0
DRL	Drill Hole Database	Y	0	0	0
DTNK	Delisted Fuel Tanks	Y	0	1	1
EASR	Environmental Activity and Sector Registry	Y	0	1	1
EBR	Environmental Registry	Y	0	0	0
ECA	Environmental Compliance Approval	Y	5	0	5
EEM	Environmental Effects Monitoring	Y	0	0	0
EHS	ERIS Historical Searches	Y	3	22	25
EIIS	Environmental Issues Inventory System	Y	0	0	0
EMHE	Emergency Management Historical Event	Y	0	0	0
EPAR	Environmental Penalty Annual Report	Y	0	0	0
EXP	List of Expired Fuels Safety Facilities	Y	0	0	0
FCON	Federal Convictions	Y	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	0	0
FOFT	Fisheries & Oceans Fuel Tanks	Y	0	0	0
FRST	Federal Identification Registry for Storage Tank Systems (FIRSTS)	Y	0	0	0
FST	Fuel Storage Tank	Y	0	0	0
FSTH	Fuel Storage Tank - Historic	Y	0	0	0
GEN	Ontario Regulation 347 Waste Generators Summary	Y	1	18	19
GHG	Greenhouse Gas Emissions from Large Facilities	Y	0	0	0
HINC	TSSA Historic Incidents	Y	0	0	0

Database	Name	Searched	Project Property	Boundary to 0.25km	Total
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0
INC	Fuel Oil Spills and Leaks	Y	0	0	0
LIMO	Landfill Inventory Management Ontario	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MNR	Mineral Occurrences	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NCPL	Non-Compliance Reports	Y	0	0	0
NDFT	National Defense & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBP	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPRI	National Pollutant Release Inventory	Y	0	0	0
OGWE	Oil and Gas Wells	Y	0	0	0
OOGW	Ontario Oil and Gas Wells	Y	0	0	0
OPCB	Inventory of PCB Storage Sites	Y	0	0	0
ORD	Orders	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PES	Pesticide Register	Y	0	1	1
PINC	Pipeline Incidents	Y	2	10	12
PRT	Private and Retail Fuel Storage Tanks	Y	0	1	1
PTTW	Permit to Take Water	Y	0	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	Y	0	0	0
RSC	Record of Site Condition	Y	0	2	2
RST	Retail Fuel Storage Tanks	Y	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	1	1
SPL	Ontario Spills	Y	3	20	23
SRDS	Wastewater Discharger Registration Database	Y	0	0	0
TANK	Anderson's Storage Tanks	Y	0	0	0
TCFT	Transport Canada Fuel Storage Tanks	Y	0	0	0
VAR	Variances for Abandonment of Underground Storage Tanks	Y	0	0	0
WDS	Waste Disposal Sites - MOE CA Inventory	Y	0	0	0
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	Y	1	0	1
WWIS	Water Well Information System	Y	15	14	29
	Total:		32	93	125

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
1	WWIS		89 LINDSAY ST N LINDSAY ON ***Well ID:*** 7283906	E/0.0	2.83	35
2	SPL	Maple Reinders Construction Limited	Kawartha Lakes ON	ENE/0.0	3.00	38
3	WDSH		St. Paul & Dennison LINDSAY ON	SSE/0.0	2.47	39
4	ANDR	St Paul-Dennison Dump (official)	Lindsay ON K9V	SSE/0.0	3.03	39
5	WWIS		89 LINDSAY ST N LINDSAY ON ***Well ID:*** 7297443	E/0.0	4.65	40
6	WWIS		140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133882	SE/0.0	3.55	42
7	EHS		140 William St N Lindsay ON K9V 5R4	WSW/0.0	2.31	45
7	GEN	REVERA INC.	140 WILLIAM STREET NORTH LINDSAY ON K9V 5R4	WSW/0.0	2.31	45

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
8	EHS		140 William Street North Lindsay ON K9V 5R4	WSW/0.0	2.25	46
9	ECA	The Corporation of the City of Kawartha Lakes	95 Lindsay St N Kawartha Lakes ON K9V 3L8	SE/0.0	3.00	46
10	WWIS		140 WILLIAM ST. N LINDSAY ON ***Well ID:*** 7221167	WSW/0.0	5.31	46
11	WWIS		140 WILLIAM ST. LINDSAY ON ***Well ID:*** 7221165	WSW/0.0	5.31	49
12	WWIS		140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133885	WSW/0.0	5.31	52
13	WWIS		140 william St LINDSAY ON ***Well ID:*** 7343417	WSW/0.0	5.31	56
14	WWIS		140 WILLIAM ST. N LINDSAY ON ***Well ID:*** 7221164	WSW/0.0	5.31	60
15	WWIS		140 William St N Lindsay ON ***Well ID:*** 7343418	SW/0.0	5.00	63
16	WWIS		140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133881	WSW/0.0	7.44	66
16	WWIS		140 WILLIAM STREET LINDSAY ON	WSW/0.0	7.44	70

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
			Well ID: 7133884			
17	WWIS		140 WILLIAM ST. N LINDSAY ON	WSW/0.0	7.44	73
			Well ID: 7221168			
18	WWIS		140 William St N Lindsay ON	WSW/0.0	7.75	76
			Well ID: 7343419			
19	WWIS		140 WILLIAM ST. N LINDSAY ON	WSW/0.0	7.75	80
			Well ID: 7221166			
20	EHS		132 William St N Kawartha Lakes ON K9V4A8	SW/0.0	4.97	82
21	WWIS		140 WILLIAM STREET LINDSAY ON	WSW/0.0	7.44	83
			Well ID: 7133883			
22	PINC	ACCUREX INC	158 WILLIAM ST N,,LINDSAY,ON,K9V 4B3,CA ON	WNW/0.0	10.46	86
22	SPL	Enbridge Gas Distribution Inc.	158 William Street North Kawartha Lakes ON	WNW/0.0	10.46	86
23	PINC	DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT	160 WILLIAM ST N,,LINDSAY,ON,K9V 4B3,CA ON	WNW/0.0	13.00	87
23	SPL	Enbridge Gas Distribution Inc.	160 Williams St, Lindsay Kawartha Lakes ON	WNW/0.0	13.00	88

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
24	CA	The Corporation of the City of Kawartha Lakes	Francis and William St Kawartha Lakes ON	SW/0.0	8.30	88
24	ECA	The Corporation of the City of Cambridge	Francis and William St Kawartha Lakes ON N1R 7L6	SW/0.0	8.30	89
24	ECA	The Corporation of the Town of Carleton Place	Francis and William St Kawartha Lakes ON K7C 2V8	SW/0.0	8.30	89
24	ECA	The Corporation of the City of Kawartha Lakes	Francis and William St Kawartha Lakes ON K9V 5R8	SW/0.0	8.30	89
24	ECA	The Corporation of the City of Kawartha Lakes	Francis and William St Kawartha Lakes ON K9V 5R8	SW/0.0	8.30	89

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
25	EASR	MAPLE REINDERS CONSTRUCTORS LTD.	87 Lindsay ST N Lindsay ON K9V 1T9	SE/1.1	2.97	90
25	SPL		87 Lindsay Street North, Lindsay Kawartha Lakes ON	SE/1.1	2.97	90
25	SPL		87, Lindsay Street North Kawartha Lakes ON	SE/1.1	2.97	91
26	WWIS		NORTHEAST CORNER OF LINDSAY & WELLINGTON ST. KAWARTHA LAKES ON ***Well ID:*** 7272007	SE/18.1	6.91	91
27	WWIS		ON ***Well ID:*** 7298614	SE/20.2	6.91	94
28	SPL	GFL Environmental Inc.	83 Lindsay St N Kawartha Lakes ON	SE/20.3	3.80	95
28	SPL	GFL Environmental Inc.	83 Lindsay St N, Lindsay Kawartha Lakes ON	SE/20.3	3.80	96
28	PES	SELECTIVE SPRAY & CUT	83 LINDSAY STREET NORTH, #2 LINDSAY ON K9V1T7	SE/20.3	3.80	97
29	WWIS		ON ***Well ID:*** 7382850	NW/24.9	7.60	97
30	WWIS		4 COLBORNE ST. E. lot 22 con 6 LINDSAY ON ***Well ID:*** 7123089	ENE/29.3	10.00	98
31	WWIS		ON ***Well ID:*** 6401760	ENE/30.5	9.97	100
32	PINC	ENBRIDGE GAS INC	5 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA ON	WSW/31.6	10.00	103

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
32	SPL		5 Colborne St West, Lindsay Kawartha Lakes ON	WSW/31.6	10.00	104
33	SPL	Enbridge Energy Distribution Inc.	58 St. Paul St. Kawartha Lakes ON	ENE/34.8	11.00	104
33	PINC	PIPELINE HIT 1/2"	58 ST PAUL ST,,KAWARTHA LAKES,ON, K9V 1S6,CA ON	ENE/34.8	11.00	105
34	WWIS		ON ***Well ID:*** 6401762	ENE/37.1	10.00	105
35	PINC	ENBRIDGE GAS INC	7 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA ON	WSW/42.7	11.05	108
36	PINC	ENBRIDGE GAS INC	10 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA ON	W/46.3	12.45	109
37	PINC	DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT	17 REGENT ST,,LINDSAY,ON,K9V 3T9, CA ON	W/47.2	14.31	109
37	SPL		17 Regent St. Lindsay Kawartha Lakes ON	W/47.2	14.31	110
38	SPL	Enbridge Gas Distribution Inc.	60 St. Paul St. Lindsay Kawartha Lakes ON	ENE/47.6	11.31	110
38	PINC	PIPELINE HIT 1/2"	60 ST PAUL ST,,LINDSAY,ON,K9V 1S6, CA ON	ENE/47.6	11.31	111
39	SPL		18 Regent Street Kawartha Lakes ON	WNW/49.7	16.31	112
40	EHS		Lindsay St Nwellington St Kawartha Lakes ON	SE/51.7	7.00	112

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
41	SPL		68 Lindsay Street North Kawartha Lakes ON	SE/55.3	5.92	113
41	EHS		68 Lindsay Street North Lindsay ON K9V 1T1	SE/55.3	5.92	113
41	EHS		68 Lindsay Street North Lindsay ON K9V 1T1	SE/55.3	5.92	113
41	EHS		68 Lindsay Street North Lindsay ON K9V 1T1	SE/55.3	5.92	114
42	WWIS		NE CORNER QUEEN ST/ LINDSAY ST N lot 21 con 6 LINDSAY ON ***Well ID:*** 7283908	SE/60.2	7.00	114
43	RSC	Digs Canada Inc.	5 BOND ST E, LINDSAY, ON, K9V 3P4 Lindsay ON K9V 3P4	SSE/72.7	3.00	116
43	EHS		5 Bond St E Kawartha Lakes ON K9V3P4	SSE/72.7	3.00	117
43	SPL		5 Bond Street East Kawartha Lakes ON K9V 3P3	SSE/72.7	3.00	117
44	EHS		COLBORNE ST W LINDSAY ON	N/78.2	3.00	118
45	SPL	Miller Waste Systems Inc.	64 St. Paul's St, LIndsay Kawartha Lakes ON	ENE/86.9	11.94	118
46	ANDR	St Paul-Dennison Dump (alt)	Lindsay ON K9V	NNE/88.0	2.00	119
47	EHS		2 Colborne Street West Lindsay ON	NNW/115.1	4.95	119
47	GEN	D.D. 2 Colborne Ltd.	2 Colborne Street West Building A Lindsay ON K9V 5B4	NNW/115.1	4.95	119

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
47	GEN	Ward and Burke Microtunnelling	2 Colborne Street W Lindsay ON K9V 3V8	NNW/115.1	4.95	120
47	SPL	North View Apartment REIT<UNOFFICIAL>	2 Colborne Street West Kawartha Lakes ON K9V 3V8	NNW/115.1	4.95	120
47	EHS		2 Colborne Street West Lindsay ON K9V	NNW/115.1	4.95	121
47	EHS		2 Colborne Street West Lindsay ON K9V	NNW/115.1	4.95	121
47	EHS		2 Colborne Street West Lindsay ON K9V	NNW/115.1	4.95	121
48	SPL	ABEX INDUSTRIES LTD.	SINISTER CREEK AT ST. DAVID STREET LINDSAY PLANT 50 COLBORNE STREET EAST LINDSAY TOWN ON	SE/117.1	8.00	121
49	PINC	FAMOUS BELGIEN WAFFLES	ELGIN ST & WILLIAM ST N,,LINDSAY, ON,,CA ON	NW/130.7	14.92	122
49	SPL	Enbridge Gas Distribution Inc.	Elgin Street N and William Street, Lindsay Kawartha Lakes ON	NW/130.7	14.92	123
50	SPL	UNKNOWN	SCUGOG RIVER AT THE CORNER OF WILLIAM AND BOND STREETS LINDSAY TOWN ON	SSW/131.2	6.37	123
51	WWIS		ON ***Well ID:*** 6401734	WNW/144.4	18.00	124
52	CA	3176461 CANADA INC., NEXACOR REALTY	91 WILLIAM STREET NORTH LINDSAY ON K9V 4A4	SSW/151.0	6.75	127
52	GEN	BELL CANADA	91 WILLIAM STREET NORTH LINDSAY ON K9V 4A4	SSW/151.0	6.75	127
52	GEN	BELL (OUT OF BUSINESS)	91 WILLIAM STREET NORTH LINDSAY ON K9V 4A4	SSW/151.0	6.75	127

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
52	DTNK	Bell Canada	William St 91, Lindsay ON LINDSAY ON	SSW/151.0	6.75	128
52	GEN	Bell Canada	91 Williams Street Lindsay ON	SSW/151.0	6.75	128
52	GEN	Bell Canada	91 Williams Street Lindsay ON	SSW/151.0	6.75	129
52	GEN	Bell Canada	91 Williams Street Lindsay ON	SSW/151.0	6.75	129
52	GEN	Bell Canada	91 Williams Street Lindsay ON	SSW/151.0	6.75	130
52	GEN	Bell Canada	91 Williams Street Lindsay ON	SSW/151.0	6.75	130
52	GEN	Bell Canada	91 Williams Street Lindsay ON K9V 4A4	SSW/151.0	6.75	131
53	WWIS		ON ***Well ID:*** 7282494	SE/151.7	6.00	131
54	WWIS		ON ***Well ID:*** 6407424	E/153.4	8.62	132
55	PINC	ALBERT ADAM DE SMIT	4 ELGIN ST,,LINDSAY,ON,K9V 3V8,CA ON	NW/157.1	10.83	135
56	PINC	DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT	33 REGENT ST,,LINDSAY,ON,K9V 3T9, CA ON	W/161.7	17.92	135
56	SPL	Enbridge Gas Distribution Inc.	33 regent st, lindsay Kawartha Lakes ON	W/161.7	17.92	136
57	SCT	DISCOUNT BAIT & TACKLE	10 QUEEN ST LINDSAY ON K9V 1E9	SE/169.5	7.56	137

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
58	GEN	Canadian Addiction Treatment Clinics LP	40 Lindsay Street Lindsay ON K9V 2L8	SE/170.6	6.00	137
59	SPL		6 Elgin St Kawartha Lakes ON	NW/172.7	13.00	137
60	PRT	MANLEY MOTORS LTD	76 WILLIAM ST N LINDSAY ON K9V 4A5	S/177.7	0.41	138
60	EHS		76 William Street North Lindsay ON K9V 4A5	S/177.7	0.41	138
61	EHS		29 Lindsay Street North Lindsay ON	SSE/178.5	4.96	138
62	WWIS		ON ***Well ID:*** 7356194	S/182.6	-0.10	138
63	WWIS		LINDSAY STREET NORTH LINDSAY ON ***Well ID:*** 7274058	SE/185.5	5.18	139
64	GEN	VICTORIA, COUNTY OF	28 FRANCIS STREET (SITE RR #2) LINDSAY ON K9V 6H7	WSW/201.3	15.05	143
65	GEN	GARRY'S TREE SERVICE LTD.	85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	SSW/204.4	6.03	144
65	GEN	GARRY'S (OUT OF BUSINESS)	85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	SSW/204.4	6.03	144
65	GEN	GARRY'S (OUT OF BUSINESS) 16-140	85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	SSW/204.4	6.03	144
66	WWIS		2000 LINDSAY ST N ON ***Well ID:*** 7319937	S/211.7	5.39	145
67	PINC	ACCUREX INC	41 REGENT ST,,LINDSAY,ON,K9V 3T9, CA ON	W/216.1	19.06	147

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
67	SPL	Enbridge Gas Distribution Inc.	41 Regent St Lindsay Kawartha Lakes ON	W/216.1	19.06	148
68	WWIS		ON ***Well ID:*** 7338168	S/224.1	-0.20	149
69	EHS		PART LOTS 5 & 6, NORTH OF KING ST LINDSAY ON K9V1G1	SE/226.6	8.00	150
70	EHS		77 to 83 William Street North Lindsay ON K9V 4A4	SSW/228.5	6.03	150
70	EHS		77 to 83 William Street North Lindsay ON K9V 4A4	SSW/228.5	6.03	150
71	SPL	CONSUMERS' GAS CO. LTD., THE	WILLIAMS ST/WELLINGTON ST. NATURAL GAS PIPELINE LINDSAY TOWN ON	S/229.2	6.64	150
72	GEN	LINDSAY HYDRO ELECTRIC SYSTEM	66 WILLIAM ST., NORTH C/O BOX 598 LINDSAY ON K9V 4A2	S/230.8	4.75	151
72	GEN	LINDSAY HYDRO (OUT OF BUSINESS)	66 WILLIAM ST., NORTH C/O BOX 598 LINDSAY ON K9V 4A2	S/230.8	4.75	151
72	GEN	LINDSAY HYDRO (OUT OF BUSINESS) 24-372	66 WILLIAM ST., NORTH C/O BOX 598 LINDSAY ON K9V 4A2	S/230.8	4.75	152
72	EHS		66 William St. N. Lindsay ON K9V 4A2	S/230.8	4.75	152
72	EHS		66 Williams St N Lindsay ON	S/230.8	4.75	152
73	EHS		77-83 William St N, Lindsay Lindsay ON K9V 4A4	SSW/231.5	4.84	153
73	EHS		77-83 William St N, Lindsay Lindsay ON K9V 4A4	SSW/231.5	4.84	153

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
73	EHS		77-83 William St N, Lindsay Lindsay ON K9V 4A4	SSW/231.5	4.84	153
74	EHS		36 Wellington Street Lindsay ON K9V 3N3	SSW/247.0	6.03	153
74	RSC	Mark Pagavathsing	36 WELLINGTON ST, KAWARTHA LAKES, ON, K9V 3N3 ON K9V 3N3	SSW/247.0	6.03	153
75	EHS		46-64, & 66 William Street North Lindsay ON K9V 4A2	S/249.1	4.75	154

Executive Summary: Summary By Data Source

ANDR - Anderson's Waste Disposal Sites

A search of the ANDR database, dated 1860s-Present has found that there are 2 ANDR site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
St Paul-Dennison Dump (official)	Lindsay ON K9V	0.0	4
St Paul-Dennison Dump (alt)	Lindsay ON K9V	88.0	46

CA - Certificates of Approval

A search of the CA database, dated 1985-Oct 30, 2011* has found that there are 2 CA site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
The Corporation of the City of Kawartha Lakes	Francis and William St Kawartha Lakes ON	0.0	24
3176461 CANADA INC., NEXACOR REALTY	91 WILLIAM STREET NORTH LINDSAY ON K9V 4A4	151.0	52

DTNK - Delisted Fuel Tanks

A search of the DTNK database, dated Feb 28, 2022 has found that there are 1 DTNK site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
Bell Canada	William St 91, Lindsay ON LINDSAY ON	151.0	52

EASR - Environmental Activity and Sector Registry

A search of the EASR database, dated Oct 2011- Feb 28, 2023 has found that there are 1 EASR site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
MAPLE REINDERS CONSTRUCTORS LTD.	87 Lindsay ST N Lindsay ON K9V 1T9	1.1	25

ECA - Environmental Compliance Approval

A search of the ECA database, dated Oct 2011- Feb 28, 2023 has found that there are 5 ECA site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
The Corporation of the City of Kawartha Lakes	95 Lindsay St N Kawartha Lakes ON K9V 3L8	0.0	9
The Corporation of the Town of Carleton Place	Francis and William St Kawartha Lakes ON K7C 2V8	0.0	24
The Corporation of the City of Cambridge	Francis and William St Kawartha Lakes ON N1R 7L6	0.0	24
The Corporation of the City of Kawartha Lakes	Francis and William St Kawartha Lakes ON K9V 5R8	0.0	24
The Corporation of the City of Kawartha Lakes	Francis and William St Kawartha Lakes ON K9V 5R8	0.0	24

EHS - ERIS Historical Searches

A search of the EHS database, dated 1999-Dec 31, 2022 has found that there are 25 EHS site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
	140 William St N Lindsay ON K9V 5R4	0.0	7

Site	Address	Distance (m)	Map Key
	140 William Street North Lindsay ON K9V 5R4	0.0	8
	132 William St N Kawartha Lakes ON K9V4A8	0.0	20
	Lindsay St Nwellington St Kawartha Lakes ON	51.7	40
	68 Lindsay Street North Lindsay ON K9V 1T1	55.3	41
	68 Lindsay Street North Lindsay ON K9V 1T1	55.3	41
	68 Lindsay Street North Lindsay ON K9V 1T1	55.3	41
	5 Bond St E Kawartha Lakes ON K9V3P4	72.7	43
	COLBORNE ST W LINDSAY ON	78.2	44
	2 Colborne Street West Lindsay ON	115.1	47
	2 Colborne Street West Lindsay ON K9V	115.1	47
	2 Colborne Street West Lindsay ON K9V	115.1	47
	2 Colborne Street West Lindsay ON K9V	115.1	47

Site	Address	Distance (m)	Map Key
	76 William Street North Lindsay ON K9V 4A5	177.7	60
	29 Lindsay Street North Lindsay ON	178.5	61
	PART LOTS 5 & 6, NORTH OF KING ST LINDSAY ON K9V1G1	226.6	69
	77 to 83 William Street North Lindsay ON K9V 4A4	228.5	70
	77 to 83 William Street North Lindsay ON K9V 4A4	228.5	70
	66 Williams St N Lindsay ON	230.8	72
	66 William St. N. Lindsay ON K9V 4A2	230.8	72
	77-83 William St N, Lindsay Lindsay ON K9V 4A4	231.5	73
	77-83 William St N, Lindsay Lindsay ON K9V 4A4	231.5	73
	77-83 William St N, Lindsay Lindsay ON K9V 4A4	231.5	73
	36 Wellington Street Lindsay ON K9V 3N3	247.0	74

Site	Address	Distance (m)	Map Key
	46-64, & 66 William Street North Lindsay ON K9V 4A2	249.1	75

GEN - Ontario Regulation 347 Waste Generators Summary

A search of the GEN database, dated 1986-Oct 31, 2022 has found that there are 19 GEN site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
REVERA INC.	140 WILLIAM STREET NORTH LINDSAY ON K9V 5R4	0.0	7
D.D. 2 Colborne Ltd.	2 Colborne Street West Building A Lindsay ON K9V 5B4	115.1	47
Ward and Burke Microtunnelling	2 Colborne Street W Lindsay ON K9V 3V8	115.1	47
Bell Canada	91 Williams Street Lindsay ON K9V 4A4	151.0	52
BELL CANADA	91 WILLIAM STREET NORTH LINDSAY ON K9V 4A4	151.0	52
BELL (OUT OF BUSINESS)	91 WILLIAM STREET NORTH LINDSAY ON K9V 4A4	151.0	52
Bell Canada	91 Williams Street Lindsay ON	151.0	52
Bell Canada	91 Williams Street Lindsay ON	151.0	52
Bell Canada	91 Williams Street Lindsay ON	151.0	52

Site	Address	Distance (m)	Map Key
Bell Canada	91 Williams Street Lindsay ON	151.0	52
Bell Canada	91 Williams Street Lindsay ON	151.0	52
Canadian Addiction Treatment Clinics LP	40 Lindsay Street Lindsay ON K9V 2L8	170.6	58
VICTORIA, COUNTY OF	28 FRANCIS STREET (SITE RR #2) LINDSAY ON K9V 6H7	201.3	64
GARRY'S TREE SERVICE LTD.	85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	204.4	65
GARRY'S (OUT OF BUSINESS)	85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	204.4	65
GARRY'S (OUT OF BUSINESS) 16-140	85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	204.4	65
LINDSAY HYDRO ELECTRIC SYSTEM	66 WILLIAM ST., NORTH C/O BOX 598 LINDSAY ON K9V 4A2	230.8	72
LINDSAY HYDRO (OUT OF BUSINESS)	66 WILLIAM ST., NORTH C/O BOX 598 LINDSAY ON K9V 4A2	230.8	72
LINDSAY HYDRO (OUT OF BUSINESS) 24-372	66 WILLIAM ST., NORTH C/O BOX 598 LINDSAY ON K9V 4A2	230.8	72

PES - Pesticide Register

A search of the PES database, dated Oct 2011- Feb 28, 2023 has found that there are 1 PES site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
SELECTIVE SPRAY & CUT	83 LINDSAY STREET NORTH, #2 LINDSAY ON K9V1T7	20.3	28

PINC - Pipeline Incidents

A search of the PINC database, dated Feb 28, 2021 has found that there are 12 PINC site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
ACCUREX INC	158 WILLIAM ST N,,LINDSAY,ON,K9V 4B3, CA ON	0.0	22
DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT	160 WILLIAM ST N,,LINDSAY,ON,K9V 4B3, CA ON	0.0	23
ENBRIDGE GAS INC	5 COLBORNE ST W,,LINDSAY,ON,K9V 3S7, CA ON	31.6	32
PIPELINE HIT 1/2"	58 ST PAUL ST,,KAWARTHA LAKES,ON, K9V 1S6,CA ON	34.8	33
ENBRIDGE GAS INC	7 COLBORNE ST W,,LINDSAY,ON,K9V 3S7, CA ON	42.7	35
ENBRIDGE GAS INC	10 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA ON	46.3	36
DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT	17 REGENT ST,,LINDSAY,ON,K9V 3T9,CA ON	47.2	37
PIPELINE HIT 1/2"	60 ST PAUL ST,,LINDSAY,ON,K9V 1S6,CA ON	47.6	38

Site	Address	Distance (m)	Map Key
FAMOUS BELGIEN WAFFLES	ELGIN ST & WILLIAM ST N,,LINDSAY,ON,,CA ON	130.7	49
ALBERT ADAM DE SMIT	4 ELGIN ST,,LINDSAY,ON,K9V 3V8,CA ON	157.1	55
DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT	33 REGENT ST,,LINDSAY,ON,K9V 3T9,CA ON	161.7	56
ACCUREX INC	41 REGENT ST,,LINDSAY,ON,K9V 3T9,CA ON	216.1	67

PRT - Private and Retail Fuel Storage Tanks

A search of the PRT database, dated 1989-1996* has found that there are 1 PRT site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
MANLEY MOTORS LTD	76 WILLIAM ST N LINDSAY ON K9V 4A5	177.7	60

RSC - Record of Site Condition

A search of the RSC database, dated 1997-Sept 2001, Oct 2004-Feb 2023 has found that there are 2 RSC site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
Digs Canada Inc.	5 BOND ST E, LINDSAY, ON, K9V 3P4 Lindsay ON K9V 3P4	72.7	43
Mark Pagavathsing	36 WELLINGTON ST, KAWARTHA LAKES, ON, K9V 3N3 ON K9V 3N3	247.0	74

SCT - Scott's Manufacturing Directory

A search of the SCT database, dated 1992-Mar 2011* has found that there are 1 SCT site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
DISCOUNT BAIT & TACKLE	10 QUEEN ST LINDSAY ON K9V 1E9	169.5	57

SPL - Ontario Spills

A search of the SPL database, dated 1988-Mar 2021; May 2021-Oct 2021 has found that there are 23 SPL site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
Maple Reinders Construction Limited	Kawartha Lakes ON	0.0	2
Enbridge Gas Distribution Inc.	158 William Street North Kawartha Lakes ON	0.0	22
Enbridge Gas Distribution Inc.	160 Williams St, Lindsay Kawartha Lakes ON	0.0	23
	87, Lindsay Street North Kawartha Lakes ON	1.1	25
	87 Lindsay Street North, Lindsay Kawartha Lakes ON	1.1	25
GFL Environmental Inc.	83 Lindsay St N, Lindsay Kawartha Lakes ON	20.3	28
GFL Environmental Inc.	83 Lindsay St N Kawartha Lakes ON	20.3	28
	5 Colborne St West, Lindsay Kawartha Lakes ON	31.6	32

Site	Address	Distance (m)	Map Key
Enbridge Energy Distribution Inc.	58 St. Paul St. Kawartha Lakes ON	34.8	33
	17 Regent St. Lindsay Kawartha Lakes ON	47.2	37
Enbridge Gas Distribution Inc.	60 St. Paul St. Lindsay Kawartha Lakes ON	47.6	38
	18 Regent Street Kawartha Lakes ON	49.7	39
	68 Lindsay Street North Kawartha Lakes ON	55.3	41
	5 Bond Street East Kawartha Lakes ON K9V 3P3	72.7	43
Miller Waste Systems Inc.	64 St. Paul's St, LIndsay Kawartha Lakes ON	86.9	45
North View Apartment REIT<UNOFFICIAL>	2 Colborne Street West Kawartha Lakes ON K9V 3V8	115.1	47
ABEX INDUSTRIES LTD.	SINISTER CREEK AT ST. DAVID STREET LINDSAY PLANT 50 COLBORNE STREET EAST LINDSAY TOWN ON	117.1	48
Enbridge Gas Distribution Inc.	Elgin Street N and William Street, Lindsay Kawartha Lakes ON	130.7	49
UNKNOWN	SCUGOG RIVER AT THE CORNER OF WILLIAM AND BOND STREETS LINDSAY TOWN ON	131.2	50
Enbridge Gas Distribution Inc.	33 regent st, lindsay Kawartha Lakes ON	161.7	56

Site	Address	Distance (m)	Map Key
	6 Elgin St Kawartha Lakes ON	172.7	59
Enbridge Gas Distribution Inc.	41 Regent St Lindsay Kawartha Lakes ON	216.1	67
CONSUMERS' GAS CO. LTD., THE	WILLIAMS ST/WELLINGTON ST. NATURAL GAS PIPELINE LINDSAY TOWN ON	229.2	71

WDSH - Waste Disposal Sites - MOE 1991 Historical Approval Inventory

A search of the WDSH database, dated Up to Oct 1990* has found that there are 1 WDSH site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
	St. Paul & Dennison LINDSAY ON	0.0	3

WWIS - Water Well Information System

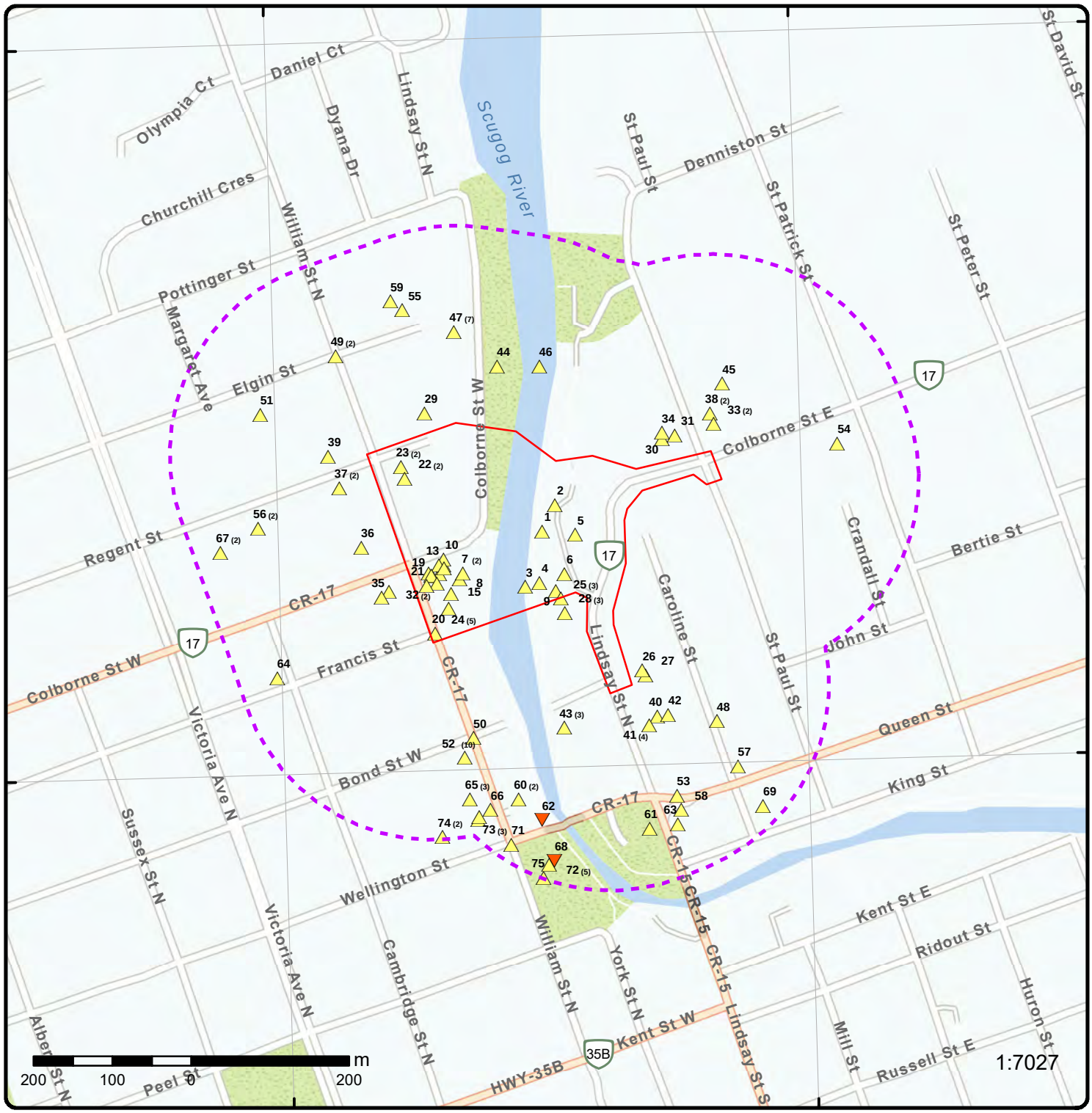
A search of the WWIS database, dated Jun 30 2022 has found that there are 29 WWIS site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
	89 LINDSAY ST N LINDSAY ON ***Well ID:*** 7283906	0.0	1
	89 LINDSAY ST N LINDSAY ON ***Well ID:*** 7297443	0.0	5
	140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133882	0.0	6
	140 WILLIAM ST. N LINDSAY ON	0.0	10

Site	Address	Distance (m)	Map Key
	Well ID: 7221167		
	140 WILLIAM ST. LINDSAY ON ***Well ID:*** 7221165	0.0	11
	140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133885	0.0	12
	140 william St LINDSAY ON ***Well ID:*** 7343417	0.0	13
	140 WILLIAM ST. N LINDSAY ON ***Well ID:*** 7221164	0.0	14
	140 William St N Lindsay ON ***Well ID:*** 7343418	0.0	15
	140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133884	0.0	16
	140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133881	0.0	16
	140 WILLIAM ST. N LINDSAY ON ***Well ID:*** 7221168	0.0	17
	140 William St N Lindsay ON ***Well ID:*** 7343419	0.0	18
	140 WILLIAM ST. N LINDSAY ON ***Well ID:*** 7221166	0.0	19
	140 WILLIAM STREET LINDSAY ON ***Well ID:*** 7133883	0.0	21

Site	Address	Distance (m)	Map Key
	NORTHEAST CORNER OF LINDSAY & WELLINGTON ST. KAWARTHA LAKES ON ***Well ID:*** 7272007	18.1	26
	ON ***Well ID:*** 7298614	20.2	27
	ON ***Well ID:*** 7382850	24.9	29
	4 COLBORNE ST. E. lot 22 con 6 LINDSAY ON ***Well ID:*** 7123089	29.3	30
	ON ***Well ID:*** 6401760	30.5	31
	ON ***Well ID:*** 6401762	37.1	34
	NE CORNER QUEEN ST/ LINDSAY ST N lot 21 con 6 LINDSAY ON ***Well ID:*** 7283908	60.2	42
	ON ***Well ID:*** 6401734	144.4	51
	ON ***Well ID:*** 7282494	151.7	53
	ON ***Well ID:*** 6407424	153.4	54
	ON ***Well ID:*** 7356194	182.6	62
	LINDSAY STREET NORTH LINDSAY ON	185.5	63

Site	Address	Distance (m)	Map Key
	Well ID: 7274058		
	2000 LINDSAY ST N ON	211.7	66
	Well ID: 7319937		
	ON	224.1	68
	Well ID: 7338168		



Map: 0.25 Kilometer Radius

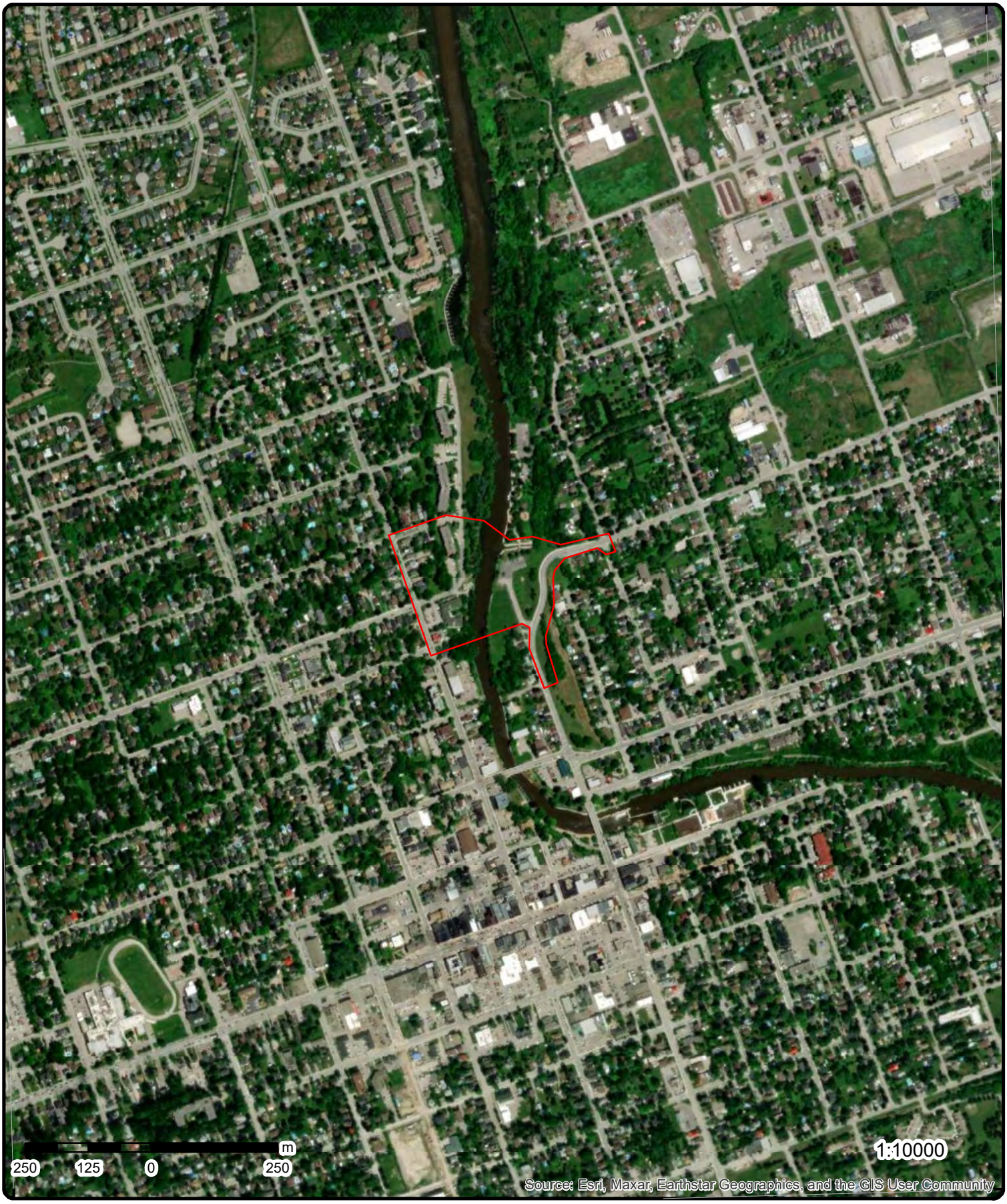
Order Number: 23041400415

Address: n/a, Kawartha Lakes, ON

ERIS

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major Arterial; Minor Arterial
- Local Road
- Service Road; Traffic Circle; Ramp
- Rail
- Beach
- Airport
- Industrial Area
- Military Base
- Aircraft Roads
- Native Reservation
- Hospital
- Shopping & Sports Area
- University/College
- Cemetery; Golf Course
- Parkt (National)
- Park (City/County)

78°43'30"W



44°21'N

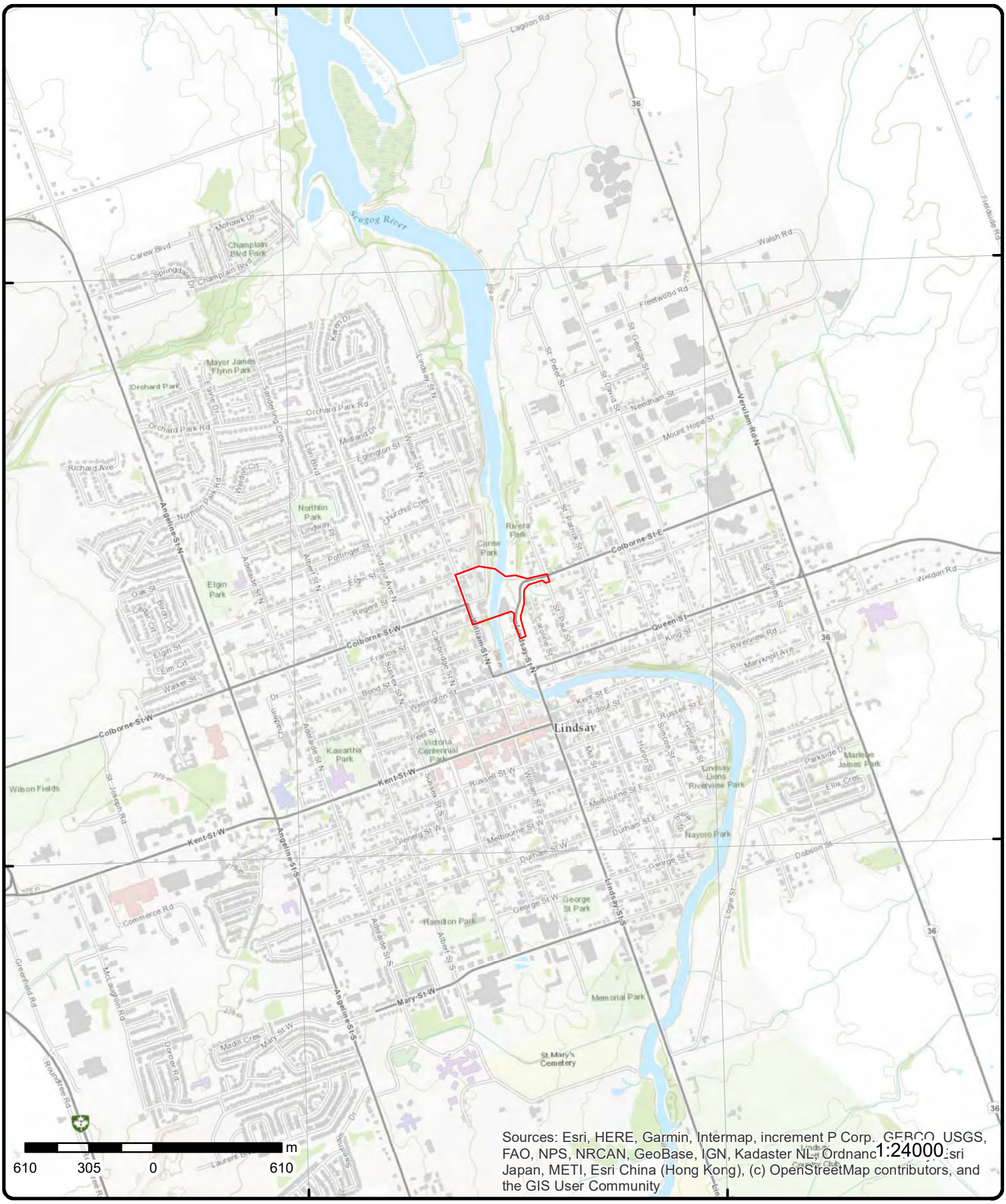
Aerial

Year: 2012

Order Number: 23041400415

Address: n/a, Kawartha Lakes, ON

Source: ESRI World Imagery



Topographic Map

Order Number: 23041400415

Address: n/a, ON

Source: ESRI World Topographic Map

Detail Report

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	1 of 1	E/0.0	249.7 / 2.83	89 LINDSAY ST N LINDSAY ON	WWIS

Well ID:	7283906	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Test Hole	**Data Entry Status:**	
Use 2nd:	Monitoring	**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	29-Mar-2017 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z254701	**Contractor:**	7247
Tag:	A217065	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	LINDSAY TOWN		
Site Info:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2017/03/22
Year Completed:	2017
Depth (m):	17.9832
Latitude:	44.3610262853717
Longitude:	-78.7375062451918
Path:	

Bore Hole Information

Bore Hole ID:	1006372333	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680291.00
Code OB Desc:		**North83:**	4914462.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	3
Date Completed:	22-Mar-2017 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	gis
Loc Method Desc:	from gis		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1006620079
Layer:	1
Color:	8
General Color:	BLACK
Mat1:	28
Most Common Material:	SAND
Mat2:	84
Mat2 Desc:	SILTY
Mat3:	01
Mat3 Desc:	FILL
Formation Top Depth:	0.0
Formation End Depth:	2.5
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006620081
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	84
Mat2 Desc:	SILTY
Mat3:	34
Mat3 Desc:	TILL
Formation Top Depth:	5.0
Formation End Depth:	6.5
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006620080
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	84
Mat2 Desc:	SILTY
Mat3:	72
Mat3 Desc:	GRAVELLY
Formation Top Depth:	2.5
Formation End Depth:	5.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006620082
Layer:	4
Color:	2
General Color:	GREY
Mat1:	26
Most Common Material:	ROCK
Mat2:	92
Mat2 Desc:	WEATHERED

Mat3:
Mat3 Desc:
Formation Top Depth: 6.5
Formation End Depth: 8.5
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006620083
Layer: 5
Color: 2
General Color: GREY
Mat1: 26
Most Common Material: ROCK
Mat2:
Mat2 Desc:
Mat3: 73
Mat3 Desc: HARD
Formation Top Depth: 8.5
Formation End Depth: 59.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006620091
Layer: 1
Plug From: 0.0
Plug To: 47.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1006620090
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1006620078
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1006620086
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 49.0
Casing Diameter: 2.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID:	1006620087
Layer:	1
Slot:	10
Screen Top Depth:	49.0
Screen End Depth:	59.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	2.125

Water Details

Water ID:	1006620085
Layer:	1
Kind Code:	8
Kind:	Untested
Water Found Depth:	5.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1006620084
Diameter:	4.0
Depth From:	0.0
Depth To:	59.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Links

Bore Hole ID:	1006372333	**Tag No:**	A217065
Depth M:	17.9832	**Contractor:**	7247
Year Completed:	2017	**Path:**	728\7283906.pdf
Well Completed Dt:	2017/03/22	**Latitude:**	44.3610262853717
Audit No:	Z254701	**Longitude:**	-78.7375062451918

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2 | ***1 of 1*** | ***ENE/0.0*** | ***249.8 / 3.00*** | ***Maple Reinders Construction Limited*** | ***SPL***

Kawartha Lakes ON

Ref No:	1708-AWLLXZ	**Contaminant Qty:**	0 other - see incident description
Site No:	NA	**Nature of Damage:**	
Incident Dt:	2018/03/06	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Leak/Break	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	2018/03/06	**Northing:**	4914495.1
Dt Document Closed:		**Easting:**	680307.33
Municipality No:			

System Facility Address:	
Client Type:	Corporation
Call Report Location Geodata:	
Contaminant Code:	41
Contaminant Name:	SOAP/WATER MIXTURRE
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	n/a
Receiving Medium:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Receiving Environment:	Surface Water
Incident Reason:	Equipment Failure
Incident Summary:	Maple Reinders: soapy water to Scugog River; product lost
Site Region:	Eastern
Site Municipality:	Kawartha Lakes
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Miscellaneous Industrial
SAC Action Class:	Watercourse Spills
Source Type:	Tank - Above Ground
Site County/District:	
Site Geo Ref Meth:	
Site District Office:	Peterborough
Nearest Watercourse:	
Site Name:	Site of new water treatment plant<UNOFFICIAL>
Site Address:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
3	1 of 1	SSE/0.0	249.3 / 2.47	St. Paul & Dennison LINDSAY ON	WDSH

Site No.:	X4020
Region:	CENTRAL
County:	VICTORIA
Concession:	
Lot:	St. Paul & Dennison
Easting:	680275
Northing:	4914175
Zone:	17
Date Closed:	1933
Status:	CLOSED
Classification:	A5 - POTENTIAL HUMAN IMPACT-URBAN MUNICIPAL/DOMESTIC WASTE - CLOSED 10-20 YRS
%CommericialWste:	n/a
%DomesticWste Rec:	n/a
%LiquidWste Rec:	n/a
%HazardousWste Rec:	n/a
%Non-haz.Wste Rec:	n/a
%Sewage/Sludge Rec:	n/a
%Other Wste Rec:	n/a

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
4	1 of 1	SSE/0.0	249.9 / 3.03	St Paul-Dennison Dump (official) Lindsay ON K9V	ANDR

Legal Description:	Ops Con 6 Lot 22
Location Description:	St Paul St & Dennison St; 25m E of Scugog River; W side of Lindsay St N*
Municipality:	Ops Township
Current Municipality:	Ops Township
RM:	Victoria County
Facility:	Dump
Date Active:	1930s
Date Begun:	
Date Complete:	1933
Area (Ha):	
Landfill Type:	
Group Name:	Scugog River
Operated By:	
Serial:	MOEE 4020
NTS:	31D07
Diameter (m):	

Historical Summary:

St Paul & Dennison Dump (official) MOEE 1994 St Paul & Dennison cited as a closed waste disposal site (Ontario Ministry of the Environment [1994] Waste disposal site inventory, [Toronto]: Ontario Environment, 1994., i, 196 pp., maps, ISBN 0772984093: 122) 1971 NTS Map 31D07 Not marked, plots to 25m E of Scugog River; W side of Lindsay St N* [1971 NTS 1:50,000 Map Lindsay ON Sheet 31D07 Edition 3 (air photos 1966, field survey 1967, culture check 1968, publication 1971)]. 1978 NTS Map 31D07 Not marked [1978 NTS 1:50,000 Map Lindsay ON Sheet 31D07 Edition 4 (air photos 1976, culture check 1976, information 1976 publication 1978)]. *(1995 MapArt Corporation, Peterborough [road map] 1995/96 edition).

Waste Type:
UTM X Nad 27: 680275
UTM Y Nad 27: 4914175
UTM Zone: 17

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5 | ***1 of 1*** | ***E/0.0*** | ***251.5 / 4.65*** | ***89 LINDSAY ST N LINDSAY ON*** | ***WWIS***

Well ID:	7297443	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:		***Data Entry Status:***	
Use 2nd:		***Data Src:***	
Final Well Status:	Abandoned-Other	***Date Received:***	16-Oct-2017 00:00:00
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	Yes
Audit No:	Z274814	***Contractor:***	7591
Tag:	A217065	***Form Version:***	7
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	VICTORIA
Elevatn Reliabilty:		***Lot:***	
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	LINDSAY TOWN		
Site Info:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2017/09/23
Year Completed:	2017
Depth (m):	
Latitude:	44.3609798635968
Longitude:	-78.7369809763923
Path:	

Bore Hole Information

Bore Hole ID:	1006766331	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	680333.00
Code OB Desc:		***North83:***	4914458.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	23-Sep-2017 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	gis
Loc Method Desc:	from gis		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			

Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1006952105
Layer:
Color:
General Color:
Mat1:
Most Common Material:
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth:
Formation End Depth:
Formation End Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1006952110
Method Construction Code:
Method Construction:
Other Method Construction:

Pipe Information

Pipe ID: 1006952104
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1006952108
Layer:
Material:
Open Hole or Material:
Depth From:
Depth To:
Casing Diameter:
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1006952109
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter:

Water Details

Water ID: 1006952107
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: m

Hole Diameter

Hole ID: 1006952106
Diameter:
Depth From:
Depth To:
Hole Depth UOM: m
Hole Diameter UOM: cm

Links

Bore Hole ID: 1006766331
Depth M:
Year Completed: 2017
Well Completed Dt: 2017/09/23
Audit No: Z274814
Tag No: A217065
Contractor: 7591
Path: 729\7297443.pdf
Latitude: 44.3609798635968
Longitude: -78.7369809763923

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6 | ***1 of 1*** | ***SE/0.0*** | ***250.4 / 3.55*** | ***140 WILLIAM STREET LINDSAY ON*** | ***WWIS***

Well ID: 7133882
Construction Date:
Use 1st: Monitoring and Test Hole
Use 2nd: 0
Final Well Status: Monitoring and Test Hole
Water Type:
Casing Material:
Audit No: Z099238
Tag: A090981
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: LINDSAY TOWN
Site Info: WKQ-001797
Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 13-Nov-2009 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: VICTORIA
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133882.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/10/14
Year Completed: 2009
Depth (m): 6.096
Latitude: 44.3605335479353
Longitude: -78.7371738493686
Path: 713\7133882.pdf

Bore Hole Information

Bore Hole ID:	1002818879	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680319.00
Code OB Desc:		**North83:**	4914408.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	14-Oct-2009 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr

Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1003010609
Layer: 3
Color: 2
General Color: GREY
Mat1: 28
Most Common Material: SAND
Mat2: 06
Mat2 Desc: SILT
Mat3: 05
Mat3 Desc: CLAY
Formation Top Depth: 15.0
Formation End Depth: 20.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1003010607
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 26
Mat2 Desc: ROCK
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 8.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1003010608
Layer: 2
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2:
Mat2 Desc:

Mat3: 66
Mat3 Desc: DENSE
Formation Top Depth: 8.0
Formation End Depth: 15.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010611
Layer: 1
Plug From: 0.0
Plug To: 1.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010612
Layer: 2
Plug From: 1.0
Plug To: 9.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010613
Layer: 3
Plug From: 9.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1003010619
Method Construction Code: D
Method Construction: Direct Push
Other Method Construction:

Pipe Information

Pipe ID: 1003010606
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1003010615
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 10.0
Casing Diameter: 4.03000020980835
Casing Diameter UOM: inch
Casing Depth UOM: ft

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Construction Record - Screen

Screen ID:	1003010616
Layer:	1
Slot:	10
Screen Top Depth:	10.0
Screen End Depth:	20.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	4.820000171661377

Water Details

Water ID:	1003010614
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1003010610
Diameter:	10.920000076293945
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Links

Bore Hole ID:	1002818879	***Tag No:***	A090981
Depth M:	6.096	***Contractor:***	7241
Year Completed:	2009	***Path:***	713\7133882.pdf
Well Completed Dt:	2009/10/14	***Latitude:***	44.3605335479353
Audit No:	Z099238	***Longitude:***	-78.7371738493686

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
7	1 of 2	WSW/0.0	249.1 / 2.31	140 William St N Lindsay ON K9V 5R4	EHS

Order No:	20090427013	***Nearest Intersection:***	
Status:	C	***Municipality:***	
Report Type:	Custom Report	***Client Prov/State:***	ON
Report Date:	5/5/2009	***Search Radius (km):***	0.25
Date Received:	4/27/2009	***X:***	-78.738895
Previous Site Name:		***Y:***	44.360457
Lot/Building Size:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
7	2 of 2	WSW/0.0	249.1 / 2.31	REVERA INC. 140 WILLIAM STREET NORTH LINDSAY ON K9V 5R4	GEN

Generator No:	ON9823784
SIC Code:	541990
SIC Description:	ALL OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES
Approval Years:	2014
PO Box No:	
Country:	Canada

Status:
Co Admin:
Choice of Contact: CO_OFFICIAL
Phone No Admin:
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 150
Waste Class Name: INERT INORGANIC WASTES

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8 | **1 of 1** | **WSW/0.0** | **249.1 / 2.25** | **140 William Street North Lindsay ON K9V 5R4** | **EHS**

Order No: 20190307143
Status: C
Report Type: Custom Report
Report Date: 15-MAR-19
Date Received: 07-MAR-19
Previous Site Name:
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans; City Directory; Aerial Photos
Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): .25
X: -78.738841
Y: 44.360513

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9 | **1 of 1** | **SE/0.0** | **249.8 / 3.00** | **The Corporation of the City of Kawartha Lakes 95 Lindsay St N Kawartha Lakes ON K9V 3L8** | **ECA**

Approval No: 1328-AN5PBL
Approval Date: 2017-07-04
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the City of Kawartha Lakes
Address: 95 Lindsay St N
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/7556-AKAJT3-14.pdf
PDF Site Location:
MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:

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10 | **1 of 1** | **WSW/0.0** | **252.1 / 5.31** | **140 WILLIAM ST. N LINDSAY ON** | **WWIS**

Well ID: 7221167
Construction Date:
Use 1st: Monitoring and Test Hole
Use 2nd: 0
Final Well Status: Monitoring and Test Hole
Water Type:
Casing Material:
Audit No: Z186825
Tag: A155795
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 30-May-2014 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: VICTORIA
Lot:
Concession:
Concession Name:
Easting NAD83:

Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: OPS TOWNSHIP
Site Info:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2014/04/18
Year Completed: 2014
Depth (m): 7.32
Latitude: 44.3607334839107
Longitude: -78.7390861324696
Path:

Bore Hole Information

Bore Hole ID: 1004795453
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 18-Apr-2014 00:00:00
Remarks:
Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 680166.00
North83: 4914426.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1005168337
Layer: 2
Color: 2
General Color: GREY
Mat1: 06
Most Common Material: SILT
Mat2: 08
Mat2 Desc: FINE SAND
Mat3: 73
Mat3 Desc: HARD
Formation Top Depth: 4.880000114440918
Formation End Depth: 7.320000171661377
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005168336
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND

Mat2: 06
Mat2 Desc: SILT
Mat3: 11
Mat3 Desc: GRAVEL
Formation Top Depth: 0.0
Formation End Depth: 4.880000114440918
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168346
Layer: 2
Plug From: 0.3100000023841858
Plug To: 3.9600000381469727
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168345
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168347
Layer: 3
Plug From: 3.9600000381469727
Plug To: 7.320000171661377
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1005168344
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1005168335
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1005168340
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 4.269999980926514
Casing Diameter: 4.03000020980835
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID:	1005168341
Layer:	1
Slot:	10
Screen Top Depth:	4.269999980926514
Screen End Depth:	7.320000171661377
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	4.820000171661377

Water Details

Water ID:	1005168339
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1005168338
Diameter:	10.920000076293945
Depth From:	0.0
Depth To:	7.320000171661377
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Links

Bore Hole ID:	1004795453	***Tag No:***	A155795
Depth M:	7.32	***Contractor:***	7241
Year Completed:	2014	***Path:***	722\7221167.pdf
Well Completed Dt:	2014/04/18	***Latitude:***	44.3607334839107
Audit No:	Z186825	***Longitude:***	-78.7390861324696

11 ***1 of 1*** ***WSW/0.0*** ***252.1 / 5.31*** ***140 WILLIAM ST. LINDSAY ON*** ***WWIS***

Well ID:	7221165	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Monitoring and Test Hole	***Data Entry Status:***	
Use 2nd:	0	***Data Src:***	
Final Well Status:	Monitoring and Test Hole	***Date Received:***	30-May-2014 00:00:00
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	Z186823	***Contractor:***	7241
Tag:	A155796	***Form Version:***	7
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	VICTORIA
Elevatn Reliabilty:		***Lot:***	
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	OPS TOWNSHIP		

Site Info:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2014/04/18
Year Completed: 2014
Depth (m): 6.1
Latitude: 44.3606705124828
Longitude: -78.7390885554252
Path:

Bore Hole Information

Bore Hole ID: 1004795447
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 18-Apr-2014 00:00:00
Remarks:
Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 680166.00
North83: 4914419.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1005168299
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 06
Mat2 Desc: SILT
Mat3: 11
Mat3 Desc: GRAVEL
Formation Top Depth: 0.0
Formation End Depth: 2.440000057220459
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005168300
Layer: 2
Color: 2
General Color: GREY
Mat1: 06
Most Common Material: SILT
Mat2: 79
Mat2 Desc: PACKED
Mat3: 68
Mat3 Desc: DRY

Formation Top Depth: 2.440000057220459
Formation End Depth: 4.880000114440918
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005168301
Layer: 3
Color: 2
General Color: GREY
Mat1: 06
Most Common Material: SILT
Mat2: 05
Mat2 Desc: CLAY
Mat3: 73
Mat3 Desc: HARD
Formation Top Depth: 4.880000114440918
Formation End Depth: 6.099999904632568
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168310
Layer: 2
Plug From: 0.3100000023841858
Plug To: 2.740000009536743
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168309
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168311
Layer: 3
Plug From: 2.740000009536743
Plug To: 6.099999904632568
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1005168308
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1005168298
Casing No: 0
Comment:

Alt Name:

Construction Record - Casing

Casing ID:	1005168304
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	3.0999999046325684
Casing Diameter:	4.03000020980835
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1005168305
Layer:	1
Slot:	10
Screen Top Depth:	3.0999999046325684
Screen End Depth:	6.099999904632568
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	4.820000171661377

Water Details

Water ID:	1005168303
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1005168302
Diameter:	10.920000076293945
Depth From:	0.0
Depth To:	6.099999904632568
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Links

Bore Hole ID:	1004795447	***Tag No:***	A155796
Depth M:	6.1	***Contractor:***	7241
Year Completed:	2014	***Path:***	722\7221165.pdf
Well Completed Dt:	2014/04/18	***Latitude:***	44.3606705124828
Audit No:	Z186823	***Longitude:***	-78.7390885554252

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12 ***1 of 1*** ***WSW/0.0*** ***252.1 / 5.31*** ***140 WILLIAM STREET LINDSAY ON*** ***WWIS***

Well ID:	7133885	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Monitoring and Test Hole	***Data Entry Status:***	
Use 2nd:	0	***Data Src:***	
Final Well Status:	Monitoring and Test Hole	***Date Received:***	13-Nov-2009 00:00:00
Water Type:		***Selected Flag:***	TRUE

Casing Material:		**Abandonment Rec:**	
Audit No:	Z106668	**Contractor:**	7241
Tag:	A084215	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	

Municipality: LINDSAY TOWN
Site Info: WKQ-001797

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133885.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/10/14
Year Completed: 2009
Depth (m): 6.096
Latitude: 44.3606342804856
Longitude: -78.7390774006377
Path: 713\7133885.pdf

Bore Hole Information

Bore Hole ID:	1002818888	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680167.00
Code OB Desc:		**North83:**	4914415.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	14-Oct-2009 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr

Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1003010820
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 26
Mat2 Desc: ROCK
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 8.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010823
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	06
Mat2 Desc:	SILT
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	17.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010821
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	
Mat2 Desc:	
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	8.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010822
Layer:	3
Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND
Mat2:	06
Mat2 Desc:	SILT
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	15.0
Formation End Depth:	17.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1003010825
Layer:	1
Plug From:	0.0
Plug To:	1.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010826
Layer: 2
Plug From: 1.0
Plug To: 9.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010827
Layer: 3
Plug From: 9.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1003010833
Method Construction Code: D
Method Construction: Direct Push
Other Method Construction:

Pipe Information

Pipe ID: 1003010819
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1003010829
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 10.0
Casing Diameter: 4.03000020980835
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1003010830
Layer: 1
Slot: 10
Screen Top Depth: 10.0
Screen End Depth: 20.0
Screen Material: 5
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter: 4.820000171661377

Water Details

Water ID: 1003010828
Layer:
Kind Code:
Kind:

Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1003010824
Diameter: 10.920000076293945
Depth From: 0.0
Depth To: 20.0
Hole Depth UOM: ft
Hole Diameter UOM: inch

Links

Bore Hole ID: 1002818888
Depth M: 6.096
Year Completed: 2009
Well Completed Dt: 2009/10/14
Audit No: Z106668
Tag No: A084215
Contractor: 7241
Path: 713\7133885.pdf
Latitude: 44.3606342804856
Longitude: -78.7390774006377

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13 | ***1 of 1*** | ***WSW/0.0*** | ***252.1 / 5.31*** | ***140 william St LINDSAY ON*** | ***WWIS***

Well ID: 7343417
Construction Date:
Use 1st: Monitoring and Test Hole
Use 2nd:
Final Well Status: Observation Wells
Water Type:
Casing Material:
Audit No: Z316605
Tag: A270887
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: OPS TOWNSHIP
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 06-Sep-2019 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: VICTORIA
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2019/07/03
Year Completed: 2019
Depth (m): 9.144
Latitude: 44.3606720023983
Longitude: -78.7391637914538
Path:

Bore Hole Information

Bore Hole ID: 1007662485
DP2BR:
Spatial Status:
Code OB:
Elevation:
Elevrc:
Zone: 17
East83: 680160.00

Code OB Desc:		***North83:***	4914419.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	03-Jul-2019 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1007865940
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	34
Most Common Material:	TILL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	10.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1007865938
Layer:	1
Color:	8
General Color:	BLACK
Mat1:	27
Most Common Material:	OTHER
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	1.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1007865939
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	01
Most Common Material:	FILL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	1.0
Formation End Depth:	10.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1007865941
Layer:	4
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	06
Mat2 Desc:	SILT
Mat3:	71
Mat3 Desc:	FRACTURED
Formation Top Depth:	25.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007867114
Layer:	2
Plug From:	1.0
Plug To:	19.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007867113
Layer:	1
Plug From:	0.0
Plug To:	1.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1007868816
Method Construction Code:	E
Method Construction:	Auger
Other Method Construction:	

Pipe Information

Pipe ID:	1007865200
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007869255
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	20.0
Casing Diameter:	2.0
Casing Diameter UOM:	Inch

Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1007869705
Layer: 1
Slot: 10
Screen Top Depth: 20.0
Screen End Depth: 30.0
Screen Material: 5
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter: 2.25

Results of Well Yield Testing

Pumping Test Method Desc:
Pump Test ID: 1007870308
Pump Set At:
Static Level:
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method: 0
Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Hole Diameter

Hole ID: 1007868298
Diameter: 6.0
Depth From: 1.0
Depth To: 30.0
Hole Depth UOM: ft
Hole Diameter UOM: Inch

Hole Diameter

Hole ID: 1007868297
Diameter: 8.0
Depth From: 0.0
Depth To: 1.0
Hole Depth UOM: ft
Hole Diameter UOM: Inch

Links

Bore Hole ID:	1007662485	***Tag No:***	A270887
Depth M:	9.144	***Contractor:***	7241
Year Completed:	2019	***Path:***	
Well Completed Dt:	2019/07/03	***Latitude:***	44.3606720023983
Audit No:	Z316605	***Longitude:***	-78.7391637914538

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
14	1 of 1	WSW/0.0	252.1 / 5.31	140 WILLIAM ST. N LINDSAY ON	WWIS

Well ID:	7221164	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	30-May-2014 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z186822	**Contractor:**	7241
Tag:	A159143	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	

Municipality: OPS TOWNSHIP
Site Info:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2014/04/18
Year Completed: 2014
Depth (m): 6.71
Latitude: 44.3605727989756
Longitude: -78.7391550594955
Path:

Bore Hole Information

Bore Hole ID:	1004795444	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680161.00
Code OB Desc:		**North83:**	4914408.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	18-Apr-2014 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr

Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1005168276
Layer: 1
Color: 6
General Color: BROWN
Mat1: 06
Most Common Material: SILT

Mat2: 05
Mat2 Desc: CLAY
Mat3: 11
Mat3 Desc: GRAVEL
Formation Top Depth: 0.0
Formation End Depth: 1.5
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005168278
Layer: 3
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 06
Mat2 Desc: SILT
Mat3: 73
Mat3 Desc: HARD
Formation Top Depth: 4.880000114440918
Formation End Depth: 6.710000038146973
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005168277
Layer: 2
Color: 2
General Color: GREY
Mat1: 06
Most Common Material: SILT
Mat2: 05
Mat2 Desc: CLAY
Mat3: 11
Mat3 Desc: GRAVEL
Formation Top Depth: 1.5
Formation End Depth: 4.880000114440918
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168286
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168288
Layer: 3
Plug From: 3.3499999046325684
Plug To: 6.710000038146973
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168287
Layer: 2
Plug From: 0.3100000023841858
Plug To: 3.3499999046325684
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1005168285
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1005168275
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1005168281
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 3.6600000858306885
Casing Diameter: 4.03000020980835
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1005168282
Layer: 1
Slot: 10
Screen Top Depth: 3.6600000858306885
Screen End Depth: 6.710000038146973
Screen Material: 5
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter: 4.820000171661377

Water Details

Water ID: 1005168280
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: m

Hole Diameter

Hole ID: 1005168279
Diameter: 10.920000076293945
Depth From: 0.0
Depth To: 6.710000038146973

Hole Depth UOM: m
Hole Diameter UOM: cm

Links

Bore Hole ID:	1004795444	**Tag No:**	A159143
Depth M:	6.71	**Contractor:**	7241
Year Completed:	2014	**Path:**	722\7221164.pdf
Well Completed Dt:	2014/04/18	**Latitude:**	44.3605727989756
Audit No:	Z186822	**Longitude:**	-78.7391550594955

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15 | **1 of 1** | **SW/0.0** | **251.8 / 5.00** | **140 William St N Lindsay ON** | **WWIS**

Well ID:	7343418	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	06-Sep-2019 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z316601	**Contractor:**	7241
Tag:	A270886	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	

Municipality: OPS TOWNSHIP
Site Info:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2019/07/02
Year Completed: 2019
Depth (m): 6.096
Latitude: 44.3603441761377
Longitude: -78.7389756235358
Path:

Bore Hole Information

Bore Hole ID:	1007662488	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680176.00
Code OB Desc:		**North83:**	4914383.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	02-Jul-2019 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr

Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:

Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1007865943
Layer: 2
Color: 6
General Color: BROWN
Mat1: 01
Most Common Material: FILL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 1.0
Formation End Depth: 8.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1007865942
Layer: 1
Color: 8
General Color: BLACK
Mat1: 27
Most Common Material: OTHER
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 1.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1007865944
Layer: 3
Color: 6
General Color: BROWN
Mat1: 34
Most Common Material: TILL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 8.0
Formation End Depth: 20.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1007867115
Layer: 1
Plug From: 0.0
Plug To: 1.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007867117
Layer:	3
Plug From:	9.0
Plug To:	20.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007867116
Layer:	2
Plug From:	1.0
Plug To:	9.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1007868817
Method Construction Code:	E
Method Construction:	Auger
Other Method Construction:	

Pipe Information

Pipe ID:	1007865201
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007869262
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	10.0
Casing Diameter:	2.0
Casing Diameter UOM:	Inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1007869713
Layer:	1
Slot:	10
Screen Top Depth:	10.0
Screen End Depth:	20.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	2.25

Results of Well Yield Testing

Pumping Test Method Desc:
Pump Test ID: 1007870315
Pump Set At:
Static Level:
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method: 0
Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Hole Diameter

Hole ID: 1007868300
Diameter: 6.0
Depth From: 1.0
Depth To: 20.0
Hole Depth UOM: ft
Hole Diameter UOM: Inch

Hole Diameter

Hole ID: 1007868299
Diameter: 8.0
Depth From: 0.0
Depth To: 1.0
Hole Depth UOM: ft
Hole Diameter UOM: Inch

Links

Bore Hole ID:	1007662488	***Tag No:***	A270886
Depth M:	6.096	***Contractor:***	7241
Year Completed:	2019	***Path:***	
Well Completed Dt:	2019/07/02	***Latitude:***	44.3603441761377
Audit No:	Z316601	***Longitude:***	-78.7389756235358

16 ***1 of 2*** ***WSW/0.0*** ***254.3 / 7.44*** ***140 WILLIAM STREET LINDSAY ON*** ***WWIS***

Well ID:	7133881	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Monitoring and Test Hole	***Data Entry Status:***	
Use 2nd:	0	***Data Src:***	
Final Well Status:	Monitoring and Test Hole	***Date Received:***	13-Nov-2009 00:00:00
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	Z099237	***Contractor:***	7241
Tag:	A090983	***Form Version:***	7
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	VICTORIA
Elevatn Reliabilty:		***Lot:***	
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	

Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	LINDSAY TOWN		
Site Info:	WKQ-001797		

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133881.pdf

Additional Detail(s) (Map)

Well Completed Date:	2009/09/14
Year Completed:	2009
Depth (m):	7.3152
Latitude:	44.3604655928857
Longitude:	-78.7391968308628
Path:	713\7133881.pdf

Bore Hole Information

Bore Hole ID:	1002818876	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680158.00
Code OB Desc:		**North83:**	4914396.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	14-Sep-2009 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1003010552
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	19.0
Formation End Depth:	24.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010551
Layer:	3
Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND

Mat2: 06
Mat2 Desc: SILT
Mat3: 66
Mat3 Desc: DENSE
Formation Top Depth: 15.0
Formation End Depth: 19.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1003010549
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 26
Mat2 Desc: ROCK
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 8.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1003010550
Layer: 2
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2:
Mat2 Desc:
Mat3: 66
Mat3 Desc: DENSE
Formation Top Depth: 8.0
Formation End Depth: 15.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010554
Layer: 1
Plug From: 0.0
Plug To: 1.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010556
Layer: 3
Plug From: 13.0
Plug To: 24.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010555
Layer: 2
Plug From: 1.0
Plug To: 13.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1003010562
Method Construction Code: D
Method Construction: Direct Push
Other Method Construction:

Pipe Information

Pipe ID: 1003010548
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1003010558
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 14.0
Casing Diameter: 4.03000020980835
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1003010559
Layer: 1
Slot: 10
Screen Top Depth: 14.0
Screen End Depth: 24.0
Screen Material: 5
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter: 4.820000171661377

Water Details

Water ID: 1003010557
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1003010553
Diameter: 10.920000076293945
Depth From: 0.0
Depth To: 24.0

Hole Depth UOM: ft
Hole Diameter UOM: inch

Links

Bore Hole ID:	1002818876	**Tag No:**	A090983
Depth M:	7.3152	**Contractor:**	7241
Year Completed:	2009	**Path:**	713\7133881.pdf
Well Completed Dt:	2009/09/14	**Latitude:**	44.3604655928857
Audit No:	Z099237	**Longitude:**	-78.7391968308628

16 | **2 of 2** | **WSW/0.0** | **254.3 / 7.44** | **140 WILLIAM STREET LINDSAY ON** | **WWIS**

Well ID:	7133884	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	13-Nov-2009 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z106667	**Contractor:**	7241
Tag:	A090982	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	

Municipality: LINDSAY TOWN
Site Info: WKQ-001797

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133884.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/10/14
Year Completed: 2009
Depth (m): 5.1816
Latitude: 44.3604655928857
Longitude: -78.7391968308628
Path: 713\7133884.pdf

Bore Hole Information

Bore Hole ID:	1002818885	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680158.00
Code OB Desc:		**North83:**	4914396.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	14-Oct-2009 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr

Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:

Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID:	1003010744
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	
Mat2 Desc:	
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	8.0
Formation End Depth:	12.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010746
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	06
Mat2 Desc:	SILT
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	16.0
Formation End Depth:	17.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010745
Layer:	3
Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND
Mat2:	06
Mat2 Desc:	SILT
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	12.0
Formation End Depth:	16.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010743
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	28

Most Common Material:	SAND
Mat2:	26
Mat2 Desc:	ROCK
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	0.0
Formation End Depth:	8.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1003010748
Layer:	1
Plug From:	0.0
Plug To:	1.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1003010750
Layer:	3
Plug From:	6.0
Plug To:	17.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1003010749
Layer:	2
Plug From:	1.0
Plug To:	6.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1003010756
Method Construction Code:	D
Method Construction:	Direct Push
Other Method Construction:	

Pipe Information

Pipe ID:	1003010742
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1003010752
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	7.0
Casing Diameter:	4.03000020980835
Casing Diameter UOM:	inch

Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1003010753
Layer: 1
Slot: 10
Screen Top Depth: 7.0
Screen End Depth: 17.0
Screen Material: 1
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter: 4.820000171661377

Water Details

Water ID: 1003010751
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1003010747
Diameter: 10.920000076293945
Depth From: 0.0
Depth To: 17.0
Hole Depth UOM: ft
Hole Diameter UOM: inch

Links

Bore Hole ID:	1002818885	***Tag No:***	A090982
Depth M:	5.1816	***Contractor:***	7241
Year Completed:	2009	***Path:***	713\7133884.pdf
Well Completed Dt:	2009/10/14	***Latitude:***	44.3604655928857
Audit No:	Z106667	***Longitude:***	-78.7391968308628

17 ***1 of 1*** ***WSW/0.0*** ***254.3 / 7.44*** ***140 WILLIAM ST. N LINDSAY ON*** ***WWIS***

Well ID:	7221168	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Monitoring and Test Hole	***Data Entry Status:***	
Use 2nd:	0	***Data Src:***	
Final Well Status:	Monitoring and Test Hole	***Date Received:***	30-May-2014 00:00:00
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	Z186824	***Contractor:***	7241
Tag:	A156367	***Form Version:***	7
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	VICTORIA
Elevatn Reliabilty:		***Lot:***	
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	

Municipality: OPS TOWNSHIP
Site Info:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2014/04/18
Year Completed: 2014
Depth (m): 6.1
Latitude: 44.3605480460019
Longitude: -78.7392689516796
Path:

Bore Hole Information

Bore Hole ID: 1004795456
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 18-Apr-2014 00:00:00
Remarks:
Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 680152.00
North83: 4914405.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1005168349
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 73
Mat3 Desc: HARD
Formation Top Depth: 0.0
Formation End Depth: 4.570000171661377
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005168350
Layer: 2
Color: 2
General Color: GREY
Mat1: 06
Most Common Material: SILT
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 05

Mat3 Desc: CLAY
Formation Top Depth: 4.570000171661377
Formation End Depth: 6.099999904632568
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168359
Layer: 2
Plug From: 0.3100000023841858
Plug To: 2.740000009536743
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168360
Layer: 3
Plug From: 2.740000009536743
Plug To: 6.099999904632568
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005168358
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1005168357
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1005168348
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1005168353
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 3.0999999046325684
Casing Diameter: 4.03000020980835
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1005168354
Layer: 1
Slot: 10
Screen Top Depth: 3.0999999046325684
Screen End Depth: 6.099999904632568
Screen Material: 5
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter: 4.820000171661377

Water Details

Water ID: 1005168352
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: m

Hole Diameter

Hole ID: 1005168351
Diameter: 10.920000076293945
Depth From: 0.0
Depth To: 6.099999904632568
Hole Depth UOM: m
Hole Diameter UOM: cm

Links

Bore Hole ID:	1004795456	**Tag No:**	A156367
Depth M:	6.1	**Contractor:**	7241
Year Completed:	2014	**Path:**	722\7221168.pdf
Well Completed Dt:	2014/04/18	**Latitude:**	44.3605480460019
Audit No:	Z186824	**Longitude:**	-78.7392689516796

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18 **1 of 1** **WSW/0.0** **254.6 / 7.75** **140 William St N Lindsay ON** **WWIS**

Well ID:	7343419	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:		**Data Src:**	
Final Well Status:	Observation Wells	**Date Received:**	06-Sep-2019 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z316606	**Contractor:**	7241
Tag:	A270888	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	OPS TOWNSHIP		
Site Info:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2019/07/03
Year Completed: 2019
Depth (m): 6.096
Latitude: 44.360557290224
Longitude: -78.7392811448878
Path:

Bore Hole Information

Bore Hole ID: 1007662491
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 03-Jul-2019 00:00:00
Remarks:
Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 680151.00
North83: 4914406.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1007865946
Layer: 2
Color: 6
General Color: BROWN
Mat1: 01
Most Common Material: FILL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 1.0
Formation End Depth: 7.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1007865947
Layer: 3
Color: 6
General Color: BROWN
Mat1: 34
Most Common Material: TILL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 7.0
Formation End Depth: 20.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID:	1007865945
Layer:	1
Color:	8
General Color:	BLACK
Mat1:	27
Most Common Material:	OTHER
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	1.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007867120
Layer:	3
Plug From:	9.0
Plug To:	20.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007867119
Layer:	2
Plug From:	1.0
Plug To:	9.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007867118
Layer:	1
Plug From:	0.0
Plug To:	1.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1007868818
Method Construction Code:	E
Method Construction:	Auger
Other Method Construction:	

Pipe Information

Pipe ID:	1007865202
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007869266
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	
Depth To:	
Casing Diameter:	2.0
Casing Diameter UOM:	Inch
Casing Depth UOM:	

Construction Record - Screen

Screen ID:	1007869716
Layer:	1
Slot:	10
Screen Top Depth:	10.0
Screen End Depth:	20.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	2.25

Results of Well Yield Testing

Pumping Test Method Desc:	
Pump Test ID:	1007870319
Pump Set At:	
Static Level:	
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	0
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

Hole Diameter

Hole ID:	1007868301
Diameter:	8.0
Depth From:	0.0
Depth To:	1.0
Hole Depth UOM:	ft
Hole Diameter UOM:	Inch

Hole Diameter

Hole ID:	1007868302
Diameter:	6.0
Depth From:	1.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	Inch

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Links

Bore Hole ID:	1007662491	***Tag No:***	A270888
Depth M:	6.096	***Contractor:***	7241
Year Completed:	2019	***Path:***	
Well Completed Dt:	2019/07/03	***Latitude:***	44.360557290224
Audit No:	Z316606	***Longitude:***	-78.7392811448878

19	*1 of 1*	*WSW/0.0*	*254.6 / 7.75*	*140 WILLIAM ST. N LINDSAY ON*	*WWIS*

Well ID:	7221166	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Monitoring and Test Hole	***Data Entry Status:***	
Use 2nd:	0	***Data Src:***	
Final Well Status:	Monitoring and Test Hole	***Date Received:***	30-May-2014 00:00:00
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	Z186821	***Contractor:***	7241
Tag:	A122435	***Form Version:***	7
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	VICTORIA
Elevatn Reliabilty:		***Lot:***	
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	

Municipality: OPS TOWNSHIP
Site Info:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2014/04/18
Year Completed:	2014
Depth (m):	6.1
Latitude:	44.3605852711799
Longitude:	-78.7393302638566
Path:	

Bore Hole Information

Bore Hole ID:	1004795450	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	680147.00
Code OB Desc:		***North83:***	4914409.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	18-Apr-2014 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr

Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID:	1005168313
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	06
Most Common Material:	SILT
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	0.0
Formation End Depth:	4.269999980926514
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1005168314
Layer:	2
Color:	2
General Color:	GREY
Mat1:	06
Most Common Material:	SILT
Mat2:	73
Mat2 Desc:	HARD
Mat3:	91
Mat3 Desc:	WATER-BEARING
Formation Top Depth:	4.269999980926514
Formation End Depth:	6.099999904632568
Formation End Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1005168323
Layer:	2
Plug From:	
Plug To:	
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1005168322
Layer:	1
Plug From:	0.0
Plug To:	0.3100000023841858
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	1005168321
Method Construction Code:	2
Method Construction:	Rotary (Convent.)
Other Method Construction:	

Pipe Information

Pipe ID: 1005168312
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1005168317
Layer: 1
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 0.0
Depth To: 3.0999999046325684
Casing Diameter: 4.03000020980835
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1005168318
Layer: 1
Slot: 10
Screen Top Depth: 3.0999999046325684
Screen End Depth: 6.099999904632568
Screen Material: 5
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter: 4.820000171661377

Water Details

Water ID: 1005168316
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: m

Hole Diameter

Hole ID: 1005168315
Diameter: 10.920000076293945
Depth From: 0.0
Depth To: 6.099999904632568
Hole Depth UOM: m
Hole Diameter UOM: cm

Links

Bore Hole ID: 1004795450
Depth M: 6.1
Year Completed: 2014
Well Completed Dt: 2014/04/18
Audit No: Z186821
Tag No: A122435
Contractor: 7241
Path: 722\7221166.pdf
Latitude: 44.3605852711799
Longitude: -78.7393302638566

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20 ***1 of 1*** ***SW/0.0*** ***251.8 / 4.97*** ***132 William St N Kawartha Lakes ON K9V4A8*** ***EHS***

Order No: 20160912070
Status: C
Report Type: Standard Report
Nearest Intersection:
Municipality:
Client Prov/State: BC

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Report Date:	16-SEP-16	**Search Radius (km):**	.25
Date Received:	12-SEP-16	**X:**	-78.739023
Previous Site Name:		**Y:**	44.360177
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans; Aerial Photos		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
21	1 of 1	WSW/0.0	254.3 / 7.44	140 WILLIAM STREET LINDSAY ON	WWIS

Well ID:	7133883	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	13-Nov-2009 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z099239	**Contractor:**	7241
Tag:	A090901	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	LINDSAY TOWN		
Site Info:	WKQ-001797		

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133883.pdf

Additional Detail(s) (Map)

Well Completed Date:	2009/01/01
Year Completed:	2009
Depth (m):	4.572
Latitude:	44.3604418330461
Longitude:	-78.7393608799848
Path:	713\7133883.pdf

Bore Hole Information

Bore Hole ID:	1002818882	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680145.00
Code OB Desc:		**North83:**	4914393.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	01-Jan-2009 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock

Materials Interval

Formation ID:	1003010700
Layer:	3
Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND
Mat2:	06
Mat2 Desc:	SILT
Mat3:	05
Mat3 Desc:	CLAY
Formation Top Depth:	12.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010698
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	26
Mat2 Desc:	ROCK
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	0.0
Formation End Depth:	8.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003010699
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	
Mat2 Desc:	
Mat3:	66
Mat3 Desc:	DENSE
Formation Top Depth:	8.0
Formation End Depth:	12.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1003010704
Layer:	3
Plug From:	4.0
Plug To:	15.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010702
Layer: 1
Plug From: 0.0
Plug To: 1.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1003010703
Layer: 2
Plug From: 1.0
Plug To: 4.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1003010710
Method Construction Code: D
Method Construction: Direct Push
Other Method Construction:

Pipe Information

Pipe ID: 1003010697
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1003010706
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 5.0
Casing Diameter: 4.03000020980835
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1003010707
Layer: 1
Slot: 10
Screen Top Depth: 5.0
Screen End Depth: 15.0
Screen Material: 5
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter: 4.820000171661377

Water Details

Water ID: 1003010705
Layer:
Kind Code:
Kind:
Water Found Depth:

Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1003010701
Diameter: 10.920000076293945
Depth From: 0.0
Depth To: 15.0
Hole Depth UOM: ft
Hole Diameter UOM: inch

Links

Bore Hole ID: 1002818882
Depth M: 4.572
Year Completed: 2009
Well Completed Dt: 2009/01/01
Audit No: Z099239
Tag No: A090901
Contractor: 7241
Path: 713\7133883.pdf
Latitude: 44.3604418330461
Longitude: -78.7393608799848

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22 **1 of 2** **WNW/0.0** **257.3 / 10.46** **ACCUREX INC** **PINC**
158 WILLIAM ST N,,LINDSAY,ON,K9V 4B3,CA
ON

Incident Id:
Incident No: 1686882
Incident Reported Dt: 7/22/2015
Type: FS-Pipeline Incident
Status Code:
Tank Status: Pipeline Damage Reason Est
Task No:
Spills Action Centre:
Fuel Type:
Fuel Occurrence Tp:
Date of Occurrence:
Occurrence Start Dt:
Depth:
Customer Acct Name: ACCUREX INC
Incident Address: 158 WILLIAM ST N,,LINDSAY,ON,K9V 4B3,CA
Operation Type:
Pipeline Type:
Regulator Type:
Summary:
Reported By:
Affiliation:
Occurrence Desc:
Damage Reason:
Notes:
Pipe Material:
Fuel Category:
Health Impact:
Environment Impact:
Property Damage:
Service Interrupt:
Enforce Policy:
Public Relation:
Pipeline System:
PSIG:
Attribute Category:
Regulator Location:
Method Details:

---

22 **2 of 2** **WNW/0.0** **257.3 / 10.46** **Enbridge Gas Distribution Inc.** **SPL**
158 William Street North
Kawartha Lakes ON

Ref No: 4832-9YMTUJ
Site No: NA
Incident Dt: 7/21/2015
Year:
Incident Cause:
Incident Event:
Environment Impact:
Nature of Impact:
MOE Response: No
Contaminant Qty: 0 other - see incident description
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved:
Site Lot:
Site Conc:
Site Geo Ref Accu:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	7/21/2015	**Northing:**	
Dt Document Closed:	8/26/2015	**Easting:**	
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	35		
Contaminant Name:	NATURAL GAS (METHANE)		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:			
Receiving Environment:			
Incident Reason:	Other		
Incident Summary:	TSSA FSB 3.25" steel ln pulled from 8" main ongoing		
Site Region:			
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Unknown / N/A		
SAC Action Class:	TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill		
Source Type:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:	Work site<UNOFFICIAL>		
Site Address:	158 William Street North		

23	1 of 2	WNW/0.0	259.8 / 13.00	DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT 160 WILLIAM ST N,,LINDSAY,ON,K9V 4B3,CA ON	PINC

Incident Id:		**Pipe Material:**	
Incident No:	1708218	**Fuel Category:**	
Incident Reported Dt:	8/25/2015	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	
Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:		**Enforce Policy:**	
Spills Action Centre:		**Public Relation:**	
Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	
Occurrence Start Dt:		**Regulator Location:**	
Depth:		**Method Details:**	
Customer Acct Name:	DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT		
Incident Address:	160 WILLIAM ST N,,LINDSAY,ON,K9V 4B3,CA		
Operation Type:			
Pipeline Type:			
Regulator Type:			
Summary:			
Reported By:			
Affiliation:			
Occurrence Desc:			
Damage Reason:			
Notes:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
23	2 of 2	WNW/0.0	259.8 / 13.00	Enbridge Gas Distribution Inc. 160 Williams St, Lindsay Kawartha Lakes ON	SPL

Ref No: 4318-9ZQJQE
Site No: NA
Incident Dt: 8/25/2015
Year:
Incident Cause:
Incident Event:
Environment Impact:
Nature of Impact:
MOE Response: No
Dt MOE Arvl on Scn:
MOE Reported Dt: 8/25/2015
Dt Document Closed: 8/26/2015
Municipality No:
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code: 35
Contaminant Name: NATURAL GAS (METHANE)
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium:
Receiving Environment:
Incident Reason: Operator/Human Error
Incident Summary: TSSA: 160 Williams St half inch plastic, safe
Site Region:
Site Municipality: Kawartha Lakes
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Miscellaneous Industrial
SAC Action Class: TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name: residential<UNOFFICIAL>
Site Address: 160 Williams St, Lindsay

Contaminant Qty: 0 n/a
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved:
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
24	1 of 5	SW/0.0	255.1 / 8.30	The Corporation of the City of Kawartha Lakes Francis and William St Kawartha Lakes ON	CA

Certificate #: 9575-7REHWY
Application Year: 2009
Issue Date: 5/7/2009
Approval Type: Municipal and Private Sewage Works
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
24	2 of 5	SW/0.0	255.1 / 8.30	The Corporation of the City of Cambridge Francis and William St Kawartha Lakes ON N1R 7L6	ECA

Approval No: 0640-4H3QNN
Approval Date: 2000-03-05
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the City of Cambridge
Address: Francis and William St
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/0134-4GDKHG-14.pdf
PDF Site Location:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
24	3 of 5	SW/0.0	255.1 / 8.30	The Corporation of the Town of Carleton Place Francis and William St Kawartha Lakes ON K7C 2V8	ECA

Approval No: 1311-746S2Z
Approval Date: 2007-08-02
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the Town of Carleton Place
Address: Francis and William St
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/7957-6ZRRY2-14.pdf
PDF Site Location:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
24	4 of 5	SW/0.0	255.1 / 8.30	The Corporation of the City of Kawartha Lakes Francis and William St Kawartha Lakes ON K9V 5R8	ECA

Approval No: 9575-7REHWY
Approval Date: 2009-05-07
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the City of Kawartha Lakes
Address: Francis and William St
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/6587-7QNRVQ-14.pdf
PDF Site Location:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
24	5 of 5	SW/0.0	255.1 / 8.30	The Corporation of the City of Kawartha Lakes Francis and William St Kawartha Lakes ON K9V 5R8	ECA

Approval No: 8581-7REHS5
Approval Date: 2009-05-07
MOE District:
City:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Status:	Approved	**Longitude:**	
Record Type:	ECA	**Latitude:**	
Link Source:	IDS	**Geometry X:**	
SWP Area Name:		**Geometry Y:**	

Approval Type: ECA-Municipal Drinking Water Systems
Project Type: Municipal Drinking Water Systems
Business Name: The Corporation of the City of Kawartha Lakes
Address: Francis and William St
Full Address:
Full PDF Link:
PDF Site Location:

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25 | **1 of 3** | **SE/1.1** | **249.8 / 2.97** | **MAPLE REINDERS CONSTRUCTORS LTD.**
87 Lindsay ST N
Lindsay ON K9V 1T9 | **EASR**

Approval No:	R-009-5110254293	**MOE District:**	Peterborough
Status:	REGISTERED	**Municipality:**	Lindsay
Date:	2018-07-19	**Latitude:**	44.36027778
Record Type:	EASR	**Longitude:**	-78.73722222
Link Source:	MOFA	**Geometry X:**	
Project Type:	Water Taking - Construction Dewatering	**Geometry Y:**	

Full Address:
Approval Type: EASR-Water Taking - Construction Dewatering
SWP Area Name: Kawartha-Haliburton
PDF URL:
PDF Site Location:

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25 | **2 of 3** | **SE/1.1** | **249.8 / 2.97** | **87 Lindsay Street North, Lindsay**
Kawartha Lakes ON | **SPL**

Ref No:	7571-B79N47	**Contaminant Qty:**	200 L
Site No:	NA	**Nature of Damage:**	
Incident Dt:	2018/12/08	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Overflow/Surcharge	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	2018/12/08	**Northing:**	4914374.5
Dt Document Closed:		**Easting:**	680316.88
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	44		
Contaminant Name:	SEWAGE,RAW UNCHLORINATED		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	n/a		
Receiving Medium:			
Receiving Environment:	Surface Water		
Incident Reason:	Weather Conditions		
Incident Summary:	GFL/Kawartha Lakes: Sewage bypass to Scugog River		
Site Region:	Eastern		
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Municipal Sewage		

SAC Action Class:	Watercourse Spills
Source Type:	Sewer (Private or Municipal)
Site County/District:	
Site Geo Ref Meth:	
Site District Office:	Peterborough
Nearest Watercourse:	Scugog Lake
Site Name:	Sanitary Sytem - Rivera Park<UNOFFICIAL>
Site Address:	87 Lindsay Street North, Lindsay

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25 | **3 of 3** | **SE/1.1** | **249.8 / 2.97** | **87, Lindsay Street North Kawartha Lakes ON** | **SPL**

Ref No:	1753-B75N3E	**Contaminant Qty:**	0 other - see incident description
Site No:	NA	**Nature of Damage:**	
Incident Dt:	2018/12/04	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Overflow/Surcharge	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	2018/12/04	**Northing:**	4914374.5
Dt Document Closed:		**Easting:**	680316.88
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	44		
Contaminant Name:	SEWAGE,RAW UNCHLORINATED		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	n/a		
Receiving Medium:			
Receiving Environment:	Surface Water		
Incident Reason:	Equipment Failure		
Incident Summary:	GFL Infrastructure: manhole overflow in Lindsay		
Site Region:	Eastern		
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Municipal Sewage		
SAC Action Class:	Watercourse Spills		
Source Type:	Sewer (Private or Municipal)		
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Peterborough		
Nearest Watercourse:	Scugog River		
Site Name:	manhole<UNOFFICIAL>		
Site Address:	87, Lindsay Street North		

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26 | **1 of 1** | **SE/18.1** | **253.8 / 6.91** | **NORTHEAST CORNER OF LINDSAY & WELLINGTON ST. KAWARTHA LAKES ON** | **WWIS**

Well ID:	7272007	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	22-Sep-2016 00:00:00
Water Type:		**Selected Flag:**	TRUE

Casing Material:		**Abandonment Rec:**	
Audit No:	Z228832	**Contractor:**	7247
Tag:	A199695	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	

Municipality: LINDSAY TOWN
Site Info:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/727\7272007.pdf

Additional Detail(s) (Map)

Well Completed Date: 2016/04/13
Year Completed: 2016
Depth (m): 6.096
Latitude: 44.359411436635
Longitude: -78.7359747463302
Path: 727\7272007.pdf

Bore Hole Information

Bore Hole ID:	1006254882	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680418.00
Code OB Desc:		**North83:**	4914286.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	13-Apr-2016 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr

Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1006316070
Layer: 1
Color: 6
General Color: BROWN
Mat1: 01
Most Common Material: FILL
Mat2: 28
Mat2 Desc: SAND
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 5.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID:	1006316072
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	06
Mat3 Desc:	SILT
Formation Top Depth:	10.5
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006316071
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	06
Most Common Material:	SILT
Mat2:	28
Mat2 Desc:	SAND
Mat3:	34
Mat3 Desc:	TILL
Formation Top Depth:	5.0
Formation End Depth:	10.5
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1006316080
Layer:	1
Plug From:	0.0
Plug To:	9.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1006316079
Method Construction Code:	2
Method Construction:	Rotary (Convent.)
Other Method Construction:	

Pipe Information

Pipe ID:	1006316069
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1006316075
Layer:	1

Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	10.0
Casing Diameter:	2.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1006316076
Layer:	1
Slot:	10
Screen Top Depth:	10.0
Screen End Depth:	20.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	2.125

Water Details

Water ID:	1006316074
Layer:	1
Kind Code:	8
Kind:	Untested
Water Found Depth:	15.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1006316073
Diameter:	8.25
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Links

Bore Hole ID:	1006254882	**Tag No:**	A199695
Depth M:	6.096	**Contractor:**	7247
Year Completed:	2016	**Path:**	727\7272007.pdf
Well Completed Dt:	2016/04/13	**Latitude:**	44.359411436635
Audit No:	Z228832	**Longitude:**	-78.7359747463302

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27 **1 of 1** **SE/20.2** **253.8 / 6.91** **ON** **WWIS**

Well ID:	7298614	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	07-Nov-2017 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	C20175	**Contractor:**	7329
Tag:	A199694	**Form Version:**	8
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Well Depth: ***Concession Name:***
Overburden/Bedrock: ***Easting NAD83:***
Pump Rate: ***Northing NAD83:***
Static Water Level: ***Zone:***
Clear/Cloudy: ***UTM Reliability:***
Municipality: LINDSAY TOWN
Site Info:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2017/10/19
Year Completed: 2017
Depth (m):
Latitude: 44.3593564665811
Longitude: -78.7359266697893
Path:

Bore Hole Information

Bore Hole ID:	1006790241	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	680422.00
Code OB Desc:		***North83:***	4914280.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	19-Oct-2017 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Links

Bore Hole ID:	1006790241	***Tag No:***	A199694
Depth M:		***Contractor:***	7329
Year Completed:	2017	***Path:***	
Well Completed Dt:	2017/10/19	***Latitude:***	44.3593564665811
Audit No:	C20175	***Longitude:***	-78.7359266697893

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28 ***1 of 3*** ***SE/20.3*** ***250.6 / 3.80*** ***GFL Environmental Inc.***
83 Lindsay St N
Kawartha Lakes ON
SPL

Ref No:	8365-AVKTRK	***Contaminant Qty:***	30 L
Site No:	NA	***Nature of Damage:***	
Incident Dt:	2018/02/01	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:		***Health/Env Conseq:***	2 - Minor Environment
Incident Event:	Leak/Break	***Agency Involved:***	
Environment Impact:		***Site Lot:***	
Nature of Impact:		***Site Conc:***	
MOE Response:	No	***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	2018/02/01	***Northing:***	4914216.56
Dt Document Closed:		***Easting:***	680324.59

Municipality No:	
System Facility Address:	
Client Type:	Corporation
Call Report Location Geodata:	
Contaminant Code:	15
Contaminant Name:	HYDRAULIC OIL
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	n/a
Receiving Medium:	
Receiving Environment:	Land; Surface Water
Incident Reason:	Equipment Failure
Incident Summary:	GFL; 30L hydraulic fluid to drainage ditch & Scugog River
Site Region:	Eastern
Site Municipality:	Kawartha Lakes
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Miscellaneous Industrial
SAC Action Class:	Watercourse Spills
Source Type:	Other
Site County/District:	
Site Geo Ref Meth:	
Site District Office:	Peterborough
Nearest Watercourse:	Scugog River
Site Name:	Excavation ditch and drainage ditch<UNOFFICIAL>
Site Address:	83 Lindsay St N

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28 | ***2 of 3*** | ***SE/20.3*** | ***250.6 / 3.80*** | ***GFL Environmental Inc.***
83 Lindsay St N, Lindsay
Kawartha Lakes ON | ***SPL***

Ref No:	1660-AVRS8T	**Contaminant Qty:**	5 L
Site No:	NA	**Nature of Damage:**	
Incident Dt:	2018/02/07	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Leak/Break	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	2018/02/07	**Northing:**	
Dt Document Closed:		**Easting:**	

Municipality No:	
System Facility Address:	
Client Type:	Corporation
Call Report Location Geodata:	
Contaminant Code:	15
Contaminant Name:	HYDRAULIC OIL
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	n/a
Receiving Medium:	
Receiving Environment:	Land; Surface Water
Incident Reason:	Equipment Failure
Incident Summary:	GFL: ~ 5 L of hydraulic oil to ditch near Scugog River, cntd & clnd
Site Region:	Eastern
Site Municipality:	Kawartha Lakes
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Miscellaneous Industrial
SAC Action Class:	Watercourse Spills

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Source Type: Other
Site County/District:
Site Geo Ref Meth:
Site District Office: Peterborough
Nearest Watercourse:
Site Name: Maple Reinders Project Site<UNOFFICIAL>
Site Address: 83 Lindsay St N, Lindsay

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28 | **3 of 3** | **SE/20.3** | **250.6 / 3.80** | **SELECTIVE SPRAY & CUT**
83 LINDSAY STREET NORTH, #2
LINDSAY ON K9V1T7 | **PES**

Detail Licence No:
Licence No: 03393
Status:
Approval Date:
Report Source: Legacy Licenses (Excluding TS)
Licence Type: Operator
Licence Type Code: 01
Licence Class: 06
Licence Control:
Latitude:
Longitude:
Lot:
Concession:
Region:
District:
County:
Trade Name:
PDF URL:

Operator Box:
Operator Class:
Operator No:
Operator Type:
Oper Area Code: 705
Oper Phone No: 8879518
Operator Ext:
Operator Lot:
Oper Concession:
Operator Region:
Operator District:
Operator County:
Op Municipality:
Post Office Box:
MOE District:
SWP Area Name:

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29 | **1 of 1** | **NW/24.9** | **254.4 / 7.60** | **ON** | **WWIS**

Well ID: 7382850
Construction Date:
Use 1st:
Use 2nd:
Final Well Status:
Water Type:
Casing Material:
Audit No: Z342851
Tag: A315807
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: LINDSAY TOWN
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status: Yes
Data Src:
Date Received: 17-Mar-2021 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: VICTORIA
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 1008639538
DP2BR:
Spatial Status:
Code OB:

Elevation:
Elevrc:
Zone: 17
East83: 680142.00

Code OB Desc:		**North83:**	4914612.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	22-Feb-2021 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Links

Bore Hole ID:	1008639538	**Tag No:**	A315807
Depth M:		**Contractor:**	7241
Year Completed:	2021	**Path:**	
Well Completed Dt:	2021/02/22	**Latitude:**	44.3624126841393
Audit No:	Z342851	**Longitude:**	-78.7393227012043

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30 | ***1 of 1*** | ***ENE/29.3*** | ***256.8 / 10.00*** | ***4 COLBORNE ST. E. lot 22 con 6 LINDSAY ON*** | ***WWIS***

Well ID:	7123089	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	
Use 2nd:		**Data Src:**	
Final Well Status:	Alteration	**Date Received:**	19-May-2009 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z098485	**Contractor:**	2662
Tag:	A079639	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	022
Depth to Bedrock:		**Concession:**	06
Well Depth:		**Concession Name:**	CON
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	OPS TOWNSHIP		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/712\7123089.pdf

Additional Detail(s) (Map)

Well Completed Date:	2009/04/30
Year Completed:	2009
Depth (m):	
Latitude:	44.3620410174267
Longitude:	-78.7355596963756
Path:	712\7123089.pdf

Bore Hole Information

Bore Hole ID:	1002426792	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680443.00

Code OB Desc:		***North83:***	4914579.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	3
Date Completed:	30-Apr-2009 00:00:00	***UTMRC Desc:***	margin of error : 10 - 30 m
Remarks:		***Location Method:***	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Annular Space/Abandonment Sealing Record

Plug ID:	1002564869
Layer:	1
Plug From:	0.0
Plug To:	6.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1002564873
Method Construction Code:	
Method Construction:	
Other Method Construction:	

Pipe Information

Pipe ID:	1002564866
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1002564871
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	-2.0
Depth To:	6.0
Casing Diameter:	6.25
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1002564872
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Water Details

Water ID:	1002564870
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1002564868
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Links

Bore Hole ID:	1002426792	***Tag No:***	A079639
Depth M:		***Contractor:***	2662
Year Completed:	2009	***Path:***	712\7123089.pdf
Well Completed Dt:	2009/04/30	***Latitude:***	44.3620410174267
Audit No:	Z098485	***Longitude:***	-78.7355596963756

31 ***1 of 1*** ***ENE/30.5*** ***256.8 / 9.97*** ***ON*** ***WWIS***

Well ID:	6401760	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Domestic	***Data Entry Status:***	
Use 2nd:	0	***Data Src:***	1
Final Well Status:	Water Supply	***Date Received:***	16-May-1967 00:00:00
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:		***Contractor:***	4713
Tag:		***Form Version:***	1
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	VICTORIA
Elevatn Reliabilty:		***Lot:***	
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	LINDSAY TOWN		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/640\6401760.pdf

Additional Detail(s) (Map)

Well Completed Date:	1966/09/12
Year Completed:	1966
Depth (m):	9.7536
Latitude:	44.3620820421208
Longitude:	-78.7353585831492
Path:	640\6401760.pdf

Bore Hole Information

Bore Hole ID:	10436791	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680458.90
Code OB Desc:		**North83:**	4914584.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	12-Sep-1966 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5

Loc Method Desc: Original Pre1985 UTM Rel Code 5: margin of error : 100 m - 300 m
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 932492462
Layer: 1
Color:
General Color:
Mat1: 02
Most Common Material: TOPSOIL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 2.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932492465
Layer: 4
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 32.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932492463
Layer: 2
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 13
Mat2 Desc: BOULDERS

Mat3:
Mat3 Desc:
Formation Top Depth: 2.0
Formation End Depth: 28.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932492464
Layer: 3
Color:
General Color:
Mat1: 17
Most Common Material: SHALE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 28.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966401760
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 10985361
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930713483
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 30.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930713484
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 32.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pumping Test Method Desc:	PUMP
Pump Test ID:	996401760
Pump Set At:	
Static Level:	15.0
Final Level After Pumping:	22.0
Recommended Pump Depth:	22.0
Pumping Rate:	10.0
Flowing Rate:	
Recommended Pump Rate:	5.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	2
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933923813
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	32.0
Water Found Depth UOM:	ft

Links

Bore Hole ID:	10436791	***Tag No:***	
Depth M:	9.7536	***Contractor:***	4713
Year Completed:	1966	***Path:***	640\6401760.pdf
Well Completed Dt:	1966/09/12	***Latitude:***	44.3620820421208
Audit No:		***Longitude:***	-78.7353585831492

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32 ***1 of 2*** ***WSW/31.6*** ***256.8 / 10.00*** ***ENBRIDGE GAS INC***
5 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA
ON ***PINC***

Incident Id:		***Pipe Material:***	
Incident No:	2843950	***Fuel Category:***	
Incident Reported Dt:	5/5/2020	***Health Impact:***	
Type:	FS-Pipeline Incident	***Environment Impact:***	
Status Code:		***Property Damage:***	
Tank Status:	Pipeline Damage Reason Est	***Service Interrupt:***	
Task No:		***Enforce Policy:***	
Spills Action Centre:		***Public Relation:***	
Fuel Type:		***Pipeline System:***	
Fuel Occurrence Tp:		***PSIG:***	
Date of Occurrence:		***Attribute Category:***	
Occurrence Start Dt:		***Regulator Location:***	
Depth:		***Method Details:***	
Customer Acct Name:	ENBRIDGE GAS INC		
Incident Address:	5 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA		
Operation Type:			
Pipeline Type:			
Regulator Type:			
Summary:			
Reported By:			
Affiliation:			

Occurrence Desc:
Damage Reason:
Notes:

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32 ***2 of 2*** ***WSW/31.6*** ***256.8 / 10.00*** ***5 Colborne St West, Lindsay***
Kawartha Lakes ON ***SPL***

Ref No:	4744-BPBHAG	***Contaminant Qty:***	0 other - see incident description
Site No:	NA	***Nature of Damage:***	
Incident Dt:	2020/05/05	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:		***Health/Env Conseq:***	2 - Minor Environment
Incident Event:	Leak/Break	***Agency Involved:***	
Environment Impact:		***Site Lot:***	
Nature of Impact:		***Site Conc:***	
MOE Response:	No	***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	2020/05/05	***Northing:***	
Dt Document Closed:	2020/07/18	***Easting:***	
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	35		
Contaminant Name:	NATURAL GAS (METHANE)		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	1075		
Receiving Medium:			
Receiving Environment:	Air		
Incident Reason:	Operator/Human Error		
Incident Summary:	TSSA/FSB: 1/2 in Plastic IP Damaged- Made Safe		
Site Region:	Eastern		
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Miscellaneous Industrial		
SAC Action Class:	TSSA - Fuel Safety Program Notifications		
Source Type:	Pipeline/Components		
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Peterborough		
Nearest Watercourse:			
Site Name:	Line Strike<UNOFFICIAL>		
Site Address:	5 Colborne St West, Lindsay		

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33 ***1 of 2*** ***ENE/34.8*** ***257.8 / 11.00*** ***Enbridge Energy Distribution Inc.***
58 St. Paul St.
Kawartha Lakes ON ***SPL***

Ref No:	3473-AZBQ77	***Contaminant Qty:***	0 other - see incident description
Site No:	NA	***Nature of Damage:***	
Incident Dt:	2018/06/01	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:		***Health/Env Conseq:***	2 - Minor Environment
Incident Event:	Leak/Break	***Agency Involved:***	
Environment Impact:		***Site Lot:***	
Nature of Impact:		***Site Conc:***	
MOE Response:	No	***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	2018/06/01	***Northing:***	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Dt Document Closed: 2018/06/16 **Easting:**
Municipality No:
System Facility Address:
Client Type: Corporation
Call Report Location Geodata:
Contaminant Code: 35
Contaminant Name: METHANE GAS, COMPRESSED (NATURAL GAS)
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1: 1971
Receiving Medium:
Receiving Environment: Air
Incident Reason: Operator/Human Error
Incident Summary: TSSA FSB: Enbridge/1/2" plastic IP service damage/valid locates/safe
Site Region: Eastern
Site Municipality: Kawartha Lakes
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Unknown / N/A
SAC Action Class: TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill
Source Type: Pipeline/Components
Site County/District:
Site Geo Ref Meth:
Site District Office: Peterborough
Nearest Watercourse:
Site Name: residential<UNOFFICIAL>
Site Address: 58 St. Paul St.

33	2 of 2	ENE/34.8	257.8 / 11.00	**PIPELINE HIT 1/2"** **58 ST PAUL ST,,KAWARTHA LAKES,ON,K9V 1S6,CA** **ON**	PINC

Incident Id: **Pipe Material:**
Incident No: 2319182 **Fuel Category:**
Incident Reported Dt: 6/4/2018 **Health Impact:**
Type: FS-Pipeline Incident **Environment Impact:**
Status Code: **Property Damage:**
Tank Status: Pipeline Damage Reason Est **Service Interrupt:**
Task No: **Enforce Policy:**
Spills Action Centre: **Public Relation:**
Fuel Type: **Pipeline System:**
Fuel Occurrence Tp: **PSIG:**
Date of Occurrence: **Attribute Category:**
Occurrence Start Dt: **Regulator Location:**
Depth: **Method Details:**
Customer Acct Name: PIPELINE HIT 1/2"
Incident Address: 58 ST PAUL ST,,KAWARTHA LAKES,ON,K9V 1S6,CA
Operation Type:
Pipeline Type:
Regulator Type:
Summary:
Reported By:
Affiliation:
Occurrence Desc:
Damage Reason:
Notes:

34	1 of 1	ENE/37.1	256.8 / 10.00	**ON**	WWIS

Well ID:	6401762	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Domestic	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	1
Final Well Status:	Water Supply	**Date Received:**	31-Jan-1967 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:		**Contractor:**	4713
Tag:		**Form Version:**	1
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	LINDSAY TOWN		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/640\6401762.pdf

Additional Detail(s) (Map)

Well Completed Date:	1966/09/15
Year Completed:	1966
Depth (m):	10.0584
Latitude:	44.3621130094518
Longitude:	-78.7355581767921
Path:	640\6401762.pdf

Bore Hole Information

Bore Hole ID:	10436793	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680442.90
Code OB Desc:		**North83:**	4914587.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	15-Sep-1966 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Loc Method Desc:	Original Pre1985 UTM Rel Code 5: margin of error : 100 m - 300 m		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932492469
Layer:	1
Color:	
General Color:	
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	

Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 2.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932492470
Layer: 2
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 2.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932492471
Layer: 3
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 33.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966401762
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 10985363
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930713487
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 33.0

Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930713486
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	30.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pumping Test Method Desc:	PUMP
Pump Test ID:	996401762
Pump Set At:	
Static Level:	14.0
Final Level After Pumping:	25.0
Recommended Pump Depth:	25.0
Pumping Rate:	8.0
Flowing Rate:	
Recommended Pump Rate:	5.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	2
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933923815
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	33.0
Water Found Depth UOM:	ft

Links

Bore Hole ID:	10436793	**Tag No:**	
Depth M:	10.0584	**Contractor:**	4713
Year Completed:	1966	**Path:**	640\6401762.pdf
Well Completed Dt:	1966/09/15	**Latitude:**	44.3621130094518
Audit No:		**Longitude:**	-78.7355581767921

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
35	1 of 1	WSW/42.7	257.9 / 11.05	ENBRIDGE GAS INC 7 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA ON	PINC

Incident Id:		**Pipe Material:**	
Incident No:	2847032	**Fuel Category:**	
Incident Reported Dt:	5/12/2020	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:		**Enforce Policy:**	
Spills Action Centre:		**Public Relation:**	
Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	
Occurrence Start Dt:		**Regulator Location:**	
Depth:		**Method Details:**	
Customer Acct Name:	ENBRIDGE GAS INC		
Incident Address:	7 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA		
Operation Type:			
Pipeline Type:			
Regulator Type:			
Summary:			
Reported By:			
Affiliation:			
Occurrence Desc:			
Damage Reason:			
Notes:			

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36 | ***1 of 1*** | ***W/46.3*** | ***259.3 / 12.45*** | ***ENBRIDGE GAS INC***
10 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA
ON | ***PINC***

Incident Id:		**Pipe Material:**	
Incident No:	2866428	**Fuel Category:**	
Incident Reported Dt:	6/12/2020	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	
Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:		**Enforce Policy:**	
Spills Action Centre:		**Public Relation:**	
Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	
Occurrence Start Dt:		**Regulator Location:**	
Depth:		**Method Details:**	
Customer Acct Name:	ENBRIDGE GAS INC		
Incident Address:	10 COLBORNE ST W,,LINDSAY,ON,K9V 3S7,CA		
Operation Type:			
Pipeline Type:			
Regulator Type:			
Summary:			
Reported By:			
Affiliation:			
Occurrence Desc:			
Damage Reason:			
Notes:			

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37 | ***1 of 2*** | ***W/47.2*** | ***261.1 / 14.31*** | ***DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT***
17 REGENT ST,,LINDSAY,ON,K9V 3T9,CA
ON | ***PINC***

Incident Id:		**Pipe Material:**	
Incident No:	1716656	**Fuel Category:**	
Incident Reported Dt:	9/9/2015	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	
Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:		**Enforce Policy:**	
Spills Action Centre:		**Public Relation:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	
Occurrence Start Dt:		**Regulator Location:**	
Depth:		**Method Details:**	
Customer Acct Name:	DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT		
Incident Address:	17 REGENT ST,,LINDSAY,ON,K9V 3T9,CA		
Operation Type:			
Pipeline Type:			
Regulator Type:			
Summary:			
Reported By:			
Affiliation:			
Occurrence Desc:			
Damage Reason:			
Notes:			

37	2 of 2	W/47.2	261.1 / 14.31	17 Regent St. Lindsay Kawartha Lakes ON	SPL

Ref No:	4556-A26RQT	**Contaminant Qty:**	0 other - see incident description
Site No:	NA	**Nature of Damage:**	
Incident Dt:	9/8/2015	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	
Incident Event:		**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	9/8/2015	**Northing:**	
Dt Document Closed:	10/3/2015	**Easting:**	
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	35		
Contaminant Name:	NATURAL GAS (METHANE)		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:			
Receiving Environment:			
Incident Reason:	Operator/Human Error		
Incident Summary:	TSSA: strike on 1/2 inch gas service, made safe		
Site Region:			
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Unknown / N/A		
SAC Action Class:	TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill		
Source Type:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:	Residence<UNOFFICIAL>		
Site Address:	17 Regent St. Lindsay		

38	1 of 2	ENE/47.6	258.1 / 11.31	Enbridge Gas Distribution Inc. 60 St. Paul St. Lindsay	SPL

Kawartha Lakes ON

Ref No:	3686-AYTQKU	**Contaminant Qty:**	0 other - see incident description
Site No:	NA	**Nature of Damage:**	
Incident Dt:	2018/05/16	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Operator/Human error	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	2018/05/16	**Northing:**	4914611.51
Dt Document Closed:		**Easting:**	680505.89
Municipality No:			
System Facility Address:			
Client Type:	Corporation		
Call Report Location Geodata:			
Contaminant Code:	35		
Contaminant Name:	NATURAL GAS (METHANE)		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	1075		
Receiving Medium:			
Receiving Environment:	Air		
Incident Reason:	Operator/Human Error		
Incident Summary:	TSSA-FSB: 0.5 pl IP gas line dmdg; made safe		
Site Region:	Eastern		
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Miscellaneous Communal		
SAC Action Class:	TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill		
Source Type:	Pipeline/Components		
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Peterborough		
Nearest Watercourse:			
Site Name:	residence<UNOFFICIAL>		
Site Address:	60 St. Paul St. Lindsay		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
38	2 of 2	ENE/47.6	258.1 / 11.31	PIPELINE HIT 1/2" 60 ST PAUL ST,,LINDSAY,ON,K9V 1S6,CA ON	PINC

Incident Id:		**Pipe Material:**	
Incident No:	2307118	**Fuel Category:**	
Incident Reported Dt:	5/17/2018	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	
Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:		**Enforce Policy:**	
Spills Action Centre:		**Public Relation:**	
Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	
Occurrence Start Dt:		**Regulator Location:**	
Depth:		**Method Details:**	
Customer Acct Name:	PIPELINE HIT 1/2"		
Incident Address:	60 ST PAUL ST,,LINDSAY,ON,K9V 1S6,CA		
Operation Type:			
Pipeline Type:			

Regulator Type:
Summary:
Reported By:
Affiliation:
Occurrence Desc:
Damage Reason:
Notes:

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39 | ***1 of 1*** | ***WNW/49.7*** | ***263.1 / 16.31*** | ***18 Regent Street Kawartha Lakes ON*** | ***SPL***

Ref No:	8151-BD5RH2	***Contaminant Qty:***	
Site No:	NA	***Nature of Damage:***	
Incident Dt:	6/14/2019	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:		***Health/Env Conseq:***	0 - No Impact
Incident Event:		***Agency Involved:***	
Environment Impact:		***Site Lot:***	
Nature of Impact:		***Site Conc:***	
MOE Response:	No	***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	6/14/2019	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:			
Contaminant Name:			
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:			
Receiving Environment:			
Incident Reason:			
Incident Summary:	caller concerned that neighbour had killed trees - herbicide use		
Site Region:	Eastern		
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Source Type:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Peterborough		
Nearest Watercourse:			
Site Name:	18 Regent Street, Lindsay<UNOFFICIAL>		
Site Address:	18 Regent Street		

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40 | ***1 of 1*** | ***SE/51.7*** | ***253.8 / 7.00*** | ***Lindsay St Nwellington St Kawartha Lakes ON*** | ***EHS***

Order No:	20161103090	***Nearest Intersection:***	
Status:	C	***Municipality:***	
Report Type:	Custom Report	***Client Prov/State:***	ON
Report Date:	09-NOV-16	***Search Radius (km):***	.25
Date Received:	03-NOV-16	***X:***	-78.735755
Previous Site Name:		***Y:***	44.358878
Lot/Building Size:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

41 **1 of 4** **SE/55.3** **252.8 / 5.92** **68 Lindsay Street North Kawartha Lakes ON** **SPL**

Ref No:	2665-BQUS4C	**Contaminant Qty:**	0 other - see incident description
Site No:	NA	**Nature of Damage:**	
Incident Dt:	2020/06/22	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Leak/Break	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	2020/06/23	**Northing:**	4914122.81
Dt Document Closed:		**Easting:**	680431.66
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	28		
Contaminant Name:	HEAT EXCHANGER FLUID (N.O.S.)		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	n/a		
Receiving Medium:			
Receiving Environment:	Land		
Incident Reason:	Unknown / N/A		
Incident Summary:	CoKawartha Lakes: Unkwn vol heat transfer fluid to grnd		
Site Region:	Eastern		
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Earth Energy (Geothermal) Systems		
SAC Action Class:			
Source Type:	Unknown / N/A		
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Peterborough		
Nearest Watercourse:			
Site Name:	Site<UNOFFICIAL>		
Site Address:	68 Lindsay Street North		

41 **2 of 4** **SE/55.3** **252.8 / 5.92** **68 Lindsay Street North Lindsay ON K9V 1T1** **EHS**

Order No:	21082400088	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	27-AUG-21	**Search Radius (km):**	.25
Date Received:	24-AUG-21	**X:**	-78.7358859
Previous Site Name:		**Y:**	44.3587877
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans		

41 **3 of 4** **SE/55.3** **252.8 / 5.92** **68 Lindsay Street North Lindsay ON K9V 1T1** **EHS**

Order No:	21082400088	**Nearest Intersection:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	27-AUG-21	**Search Radius (km):**	.25
Date Received:	24-AUG-21	**X:**	-78.7358859
Previous Site Name:		**Y:**	44.3587877
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans		

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41 | **4 of 4** | **SE/55.3** | **252.8 / 5.92** | **68 Lindsay Street North Lindsay ON K9V 1T1** | **EHS**

Order No:	21082400088	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	27-AUG-21	**Search Radius (km):**	.25
Date Received:	24-AUG-21	**X:**	-78.7358859
Previous Site Name:		**Y:**	44.3587877
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans		

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42 | **1 of 1** | **SE/60.2** | **253.8 / 7.00** | **NE CORNER QUEEN ST/ LINDSAY ST N lot 21 con 6 LINDSAY ON** | **WWIS**

Well ID:	7283908	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	
Use 2nd:		**Data Src:**	
Final Well Status:	Abandoned-Other	**Date Received:**	30-Mar-2017 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	Yes
Audit No:	Z246112	**Contractor:**	7147
Tag:		**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	021
Depth to Bedrock:		**Concession:**	06
Well Depth:		**Concession Name:**	CON
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	OPS TOWNSHIP		
Site Info:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2017/03/10
Year Completed:	2017
Depth (m):	
Latitude:	44.3588904638812
Longitude:	-78.7355807174088
Path:	

Bore Hole Information

Bore Hole ID:	1006372640	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17

Code OB:		**East83:**	680451.00
Code OB Desc:		**North83:**	4914229.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	10-Mar-2017 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1006620120
Layer:	
Color:	
General Color:	
Mat1:	
Most Common Material:	
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	
Formation End Depth:	
Formation End Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1006620126
Layer:	1
Plug From:	0.0
Plug To:	2.200000047683716
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1006620127
Layer:	2
Plug From:	2.200000047683716
Plug To:	6.0
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	1006620125
Method Construction Code:	
Method Construction:	
Other Method Construction:	

Pipe Information

Pipe ID:	1006620119
Casing No:	0
Comment:	

Alt Name:

Construction Record - Casing

Casing ID:	1006620123
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	3.0
Casing Diameter:	5.0
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1006620124
Layer:	1
Slot:	.01
Screen Top Depth:	3.0
Screen End Depth:	6.0
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.300000190734863

Water Details

Water ID:	1006620122
Layer:	1
Kind Code:	
Kind:	
Water Found Depth:	3.0
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1006620121
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Links

Bore Hole ID:	1006372640	***Tag No:***	
Depth M:		***Contractor:***	7147
Year Completed:	2017	***Path:***	728\7283908.pdf
Well Completed Dt:	2017/03/10	***Latitude:***	44.3588904638812
Audit No:	Z246112	***Longitude:***	-78.7355807174088

43 ***1 of 3*** ***SSE/72.7*** ***249.8 / 3.00*** ***Digs Canada Inc.*** ***5 BOND ST E, LINDSAY, ON, K9V 3P4*** ***Lindsay ON K9V 3P4*** ***RSC***

RSC ID:	2851	***Cert Date:***	31-Aug-04
RA No:		***Cert Prop Use No:***	No CPU
RSC Type:		***Intended Prop Use:***	Residential
Curr Property Use:	Industrial	***Qual Person Name:***	Wayne Long
Ministry District:	KAWARTHA LAKES	***Stratified (Y/N):***	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Filing Date:	2-Feb-06	**Audit (Y/N):**	
Date Ack:		**Entire Leg Prop. (Y/N):**	Yes
Date Returned:		**Accuracy Estimate:**	2 to 5 meters
Restoration Type:		**Telephone:**	416-3858171
Soil Type:		**Fax:**	416-3858085
Criteria:		**Email:**	wlong@longarchitect.com
CPU Issued Sect 1686:	No		
Asmt Roll No:	1.65103E+14		
Prop ID No (PIN):			
Property Municipal Address:	5 BOND ST E, LINDSAY, ON, K9V 3P4		
Mailing Address:	Suite 901, 255 DUNCAN MILL RD, TORONTO, ON, M3B 3H9		
Latitude & Latitude:	44.35878880N 78.73726610W (converted from UTM)		
UTM Coordinates:	NAD83 17-680317-4914214		
Consultant:			
Legal Desc:	Lot 2 and Broken Lot 3, South Bond Street and East Scugog River, Town Plot, Town of Lindsay, Victoria County, City of Kawartha Lakes, as previously described in Deed No., Save and Except Part 1 on Reference Plan 57R-3538		
Measurement Method:	Global Positioning System		
Applicable Standards:	Background Site Conditions Standard, with Potable Ground Water, Coarse Textured Soil, for Residential/Parkland/Institutional property use		
RSC PDF:			

43	2 of 3	SSE/72.7	249.8 / 3.00	**5 Bond St E** **Kawartha Lakes ON K9V3P4**	EHS

Order No:	20160114144	**Nearest Intersection:**	
Status:	C	**Municipality:**	Lindsay, City of Kawartha Lakes
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	21-JAN-16	**Search Radius (km):**	.25
Date Received:	14-JAN-16	**X:**	-78.737237
Previous Site Name:	Previous boat works, lumber yard	**Y:**	44.358782
Lot/Building Size:			
Additional Info Ordered:			

43	3 of 3	SSE/72.7	249.8 / 3.00	**5 Bond Street East** **Kawartha Lakes ON K9V 3P3**	SPL

Ref No:	8521-BEEJRT	**Contaminant Qty:**	100 L
Site No:	NA	**Nature of Damage:**	
Incident Dt:	7/25/2019	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Overflow/Surcharge	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	7/25/2019	**Northing:**	4914251.5
Dt Document Closed:		**Easting:**	680341.97
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	44		
Contaminant Name:	SEWAGE,RAW UNCHLORINATED		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	n/a		
Receiving Medium:			
Receiving Environment:	Land		
Incident Reason:	Blockage		
Incident Summary:	Manhole surcharging sewage to street (100L), Lindsay		

Site Region:	Eastern
Site Municipality:	Kawartha Lakes
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Municipal Sewage
SAC Action Class:	Land Spills
Source Type:	Other
Site County/District:	
Site Geo Ref Meth:	
Site District Office:	Peterborough
Nearest Watercourse:	
Site Name:	CB<UNOFFICIAL>
Site Address:	5 Bond Street East

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44 | **1 of 1** | **N/78.2** | **249.8 / 3.00** | **COLBORNE ST W LINDSAY ON** | **EHS**

Order No:	20060810023	**Nearest Intersection:**	POTTINGER ST
Status:	C	**Municipality:**	
Report Type:	Site Report	**Client Prov/State:**	ON
Report Date:	8/14/2006	**Search Radius (km):**	0.25
Date Received:	8/10/2006	**X:**	-78.73815
Previous Site Name:		**Y:**	44.362922
Lot/Building Size:			
Additional Info Ordered:			

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45 | **1 of 1** | **ENE/86.9** | **258.8 / 11.94** | **Miller Waste Systems Inc. 64 St. Paul's St, LIndsay Kawartha Lakes ON** | **SPL**

Ref No:	8705-B2TRUF	**Contaminant Qty:**	80 L
Site No:	NA	**Nature of Damage:**	
Incident Dt:	2018/07/19	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	2 - Minor Environment
Incident Event:	Leak/Break	**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	2018/07/19	**Northing:**	4914658
Dt Document Closed:		**Easting:**	680462
Municipality No:			
System Facility Address:			
Client Type:	Corporation		
Call Report Location Geodata:			
Contaminant Code:	13		
Contaminant Name:	DIESEL FUEL		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	1202		
Receiving Medium:			
Receiving Environment:	Land		
Incident Reason:	Operator/Human Error		
Incident Summary:	Miller Waste: ~ 80 L diesel fuel to road, cntd & clng		
Site Region:	Eastern		
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Miscellaneous Industrial		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

SAC Action Class: Land Spills
Source Type: Truck - Only Saddle Tanks
Site County/District:
Site Geo Ref Meth:
Site District Office: Peterborough
Nearest Watercourse:
Site Name: site<UNOFFICIAL>
Site Address: 64 St. Paul's St, LIndsay

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46 | **1 of 1** | **NNE/88.0** | **248.8 / 2.00** | **St Paul-Dennison Dump (alt)** | **ANDR**

Lindsay ON K9V

Legal Description: Ops Con 6 Lot 22
Location Description: St Paul St & Dennison St; Rivera Park* near intersection of St Paul St* & Dennison St*
Municipality: Ops Township
Current Municipality: Ops Township
RM: Victoria County
Facility: Dump
Date Active: 1930s
Date Begun:
Date Complete: 1933
Area (Ha):
Landfill Type:
Group Name: Scugog River
Operated By:
Serial: MOEE 4020 alt
NTS: 31D07
Diameter (m):

Historical Summary:

St Paul & Dennison Dump (alt) This datapoint created to express a plausible alterante position for MOEE 4020 whose UTM co-ordinates conflict with the described location of St Paul & Dennison. This new point takes a centroid on Rivera Park, near the intersection of St Paul St & Dennison St 1971 NTS Map 31D07 Not marked, plots to Rivera Park* near intersection of St Paul St* & Dennison St* [1971 NTS 1:50,000 Map Lindsay ON Sheet 31D07 Edition 3 (air photos 1966, field survey 1967, culture check 1968, publication 1971)]. 1978 NTS Map 31D07 Not marked [1978 NTS 1:50,000 Map Lindsay ON Sheet 31D07 Edition 4 (air photos 1976, culture check 1976, information 1976 publication 1978)]. *(1995 MapArt Corporation, Peterborough [road map] 1995/96 edition).

Waste Type:
UTM X Nad 27: 680275
UTM Y Nad 27: 4914450
UTM Zone: 17

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47 | **1 of 7** | **NNW/115.1** | **251.8 / 4.95** | **2 Colborne Street West**
Lindsay ON | **EHS**

Order No: 20120627031
Status: C
Report Type: Custom Report
Report Date: 05-JUL-12
Date Received: 27-JUN-12
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:

Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): .25
X: -78.738417
Y: 44.361853

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47 | **2 of 7** | **NNW/115.1** | **251.8 / 4.95** | **D.D. 2 Colborne Ltd.**
2 Colborne Street West Building A
Lindsay ON K9V 5B4 | **GEN**

Generator No: ON9807148

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

SIC Code: 531111
SIC Description: LESSORS OF RESIDENTIAL BUILDINGS AND DWELLINGS (EXCEPT SOCIAL HOUSING PROJECTS)
Approval Years: 2016
PO Box No:
Country: Canada
Status:
Co Admin: Greg Wills
Choice of Contact: CO_ADMIN
Phone No Admin: 6477250407 Ext.
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

47	3 of 7	NNW/115.1	251.8 / 4.95	Ward and Burke Microtunnelling 2 Colborne Street W Lindsay ON K9V 3V8	GEN

Generator No: ON8591837
SIC Code:
SIC Description:
Approval Years: As of Dec 2017
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 150 L
Waste Class Name: Inert organic wastes

47	4 of 7	NNW/115.1	251.8 / 4.95	North View Apartment REIT<UNOFFICIAL> 2 Colborne Street West Kawartha Lakes ON K9V 3V8	SPL

Ref No: 8748-BDTPWW
Site No: NA
Incident Dt: 7/6/2019
Year:
Incident Cause:
Incident Event: Overflow/Surcharge
Environment Impact:
Nature of Impact:
MOE Response: No
Dt MOE Arvl on Scn:
MOE Reported Dt: 7/6/2019
Dt Document Closed:
Municipality No:
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code: 44
Contaminant Name: SEWAGE,RAW UNCHLORINATED
Contaminant Limit 1:
Contam Limit Freq 1:

Contaminant Qty: 100 L
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq: 2 - Minor Environment
Agency Involved:
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:

Contaminant UN No 1:	n/a
Receiving Medium:	
Receiving Environment:	Land
Incident Reason:	Unknown / N/A
Incident Summary:	SPILL: Raw sewage to lawn, clnd.
Site Region:	Eastern
Site Municipality:	Kawartha Lakes
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Miscellaneous Communal
SAC Action Class:	
Source Type:	Sewer (Private or Municipal)
Site County/District:	
Site Geo Ref Meth:	
Site District Office:	Peterborough
Nearest Watercourse:	
Site Name:	Building B<UNOFFICIAL>
Site Address:	2 Colborne Street West

47 | **5 of 7** | **NNW/115.1** | **251.8 / 4.95** | **2 Colborne Street West, Lindsay ON K9V** | **EHS**

Order No:	21030300021	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	08-MAR-21	**Search Radius (km):**	.25
Date Received:	03-MAR-21	**X:**	-78.7388155
Previous Site Name:		**Y:**	44.3633283
Lot/Building Size:			
Additional Info Ordered:			

47 | **6 of 7** | **NNW/115.1** | **251.8 / 4.95** | **2 Colborne Street West, Lindsay ON K9V** | **EHS**

Order No:	21030300021	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	08-MAR-21	**Search Radius (km):**	.25
Date Received:	03-MAR-21	**X:**	-78.7388155
Previous Site Name:		**Y:**	44.3633283
Lot/Building Size:			
Additional Info Ordered:			

47 | **7 of 7** | **NNW/115.1** | **251.8 / 4.95** | **2 Colborne Street West, Lindsay ON K9V** | **EHS**

Order No:	21030300021	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	08-MAR-21	**Search Radius (km):**	.25
Date Received:	03-MAR-21	**X:**	-78.7388155
Previous Site Name:		**Y:**	44.3633283
Lot/Building Size:			
Additional Info Ordered:			

48 | **1 of 1** | **SE/117.1** | **254.8 / 8.00** | **ABEX INDUSTRIES LTD., SINISTER CREEK AT ST. DAVID STREET, LINDSAY PLANT 50 COLBORNE STREET EAST** | **SPL**

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
				LINDSAY TOWN ON	

Ref No: 50183
Site No:
Incident Dt: 3/20/1991
Year:
Incident Cause: WASTEWATER DISCHARGE TO WATERCOURSE
Incident Event:
Environment Impact: NOT ANTICIPATED
Nature of Impact:
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 3/20/1991
Dt Document Closed:
Municipality No: 72401
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: EQUIPMENT FAILURE
Incident Summary: BACKENTRY-ABEX INDUSTRIES- UNKNOWN QTY OF COOLING WATER TO SINISTER CREEK.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Contaminant Qty:
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved: TOWN OF LINDSAY WORKS DEPT.
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing: 4914000.00
Easting: 680500.00

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
49	1 of 2	NW/130.7	261.8 / 14.92	FAMOUS BELGIEN WAFFLES ELGIN ST & WILLIAM ST N,,LINDSAY,ON,,CA ON	PINC

Incident Id:
Incident No: 1862810
Incident Reported Dt: 5/12/2016
Type: FS-Pipeline Incident
Status Code:
Tank Status: Pipeline Damage Reason Est
Task No:
Spills Action Centre:
Fuel Type:
Fuel Occurrence Tp:
Date of Occurrence:
Occurrence Start Dt:
Depth:
Customer Acct Name: FAMOUS BELGIEN WAFFLES
Incident Address: ELGIN ST & WILLIAM ST N,,LINDSAY,ON,,CA
Operation Type:

Pipe Material:
Fuel Category:
Health Impact:
Environment Impact:
Property Damage:
Service Interrupt:
Enforce Policy:
Public Relation:
Pipeline System:
PSIG:
Attribute Category:
Regulator Location:
Method Details:

Pipeline Type:
Regulator Type:
Summary:
Reported By:
Affiliation:
Occurrence Desc:
Damage Reason:
Notes:

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49 | ***2 of 2*** | ***NW/130.7*** | ***261.8 / 14.92*** | ***Enbridge Gas Distribution Inc.*** ***Elgin Street N and William Street, Lindsay*** ***Kawartha Lakes ON*** | ***SPL***

Ref No:	1057-A9UPRL	***Contaminant Qty:***	0 other - see incident description
Site No:	NA	***Nature of Damage:***	
Incident Dt:	2016/05/11	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:		***Health/Env Conseq:***	
Incident Event:	Leak/Break	***Agency Involved:***	
Environment Impact:		***Site Lot:***	
Nature of Impact:		***Site Conc:***	
MOE Response:	No	***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	2016/05/11	***Northing:***	
Dt Document Closed:	2016/08/16	***Easting:***	

Municipality No:
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code: 35
Contaminant Name: NATURAL GAS (METHANE)
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium:
Receiving Environment: Air
Incident Reason: Operator/Human Error
Incident Summary: TSSA/Enbridge: 4 " gasline damage
Site Region:
Site Municipality: Kawartha Lakes
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Unknown / N/A
SAC Action Class: TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name: Enbridge - 4" gasline T<UNOFFICIAL>
Site Address: Elgin Street N and William Street, Lindsay

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50 | ***1 of 1*** | ***SSW/131.2*** | ***253.2 / 6.37*** | ***UNKNOWN*** ***SCUGOG RIVER AT THE CORNER OF WILLIAM AND BOND STREETS*** ***LINDSAY TOWN ON*** | ***SPL***

Ref No:	166601	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	4/15/1999	***Discharger Report:***	
Year:		***Material Group:***	

Incident Cause:	UNKNOWN	**Health/Env Conseq:**	
Incident Event:		**Agency Involved:**	FIRE, WORKS
Environment Impact:	CONFIRMED	**Site Lot:**	
Nature of Impact:	Water course or lake	**Site Conc:**	
MOE Response:		**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	4/15/1999	**Northing:**	
Dt Document Closed:		**Easting:**	
Municipality No:	72401		

System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: UNKNOWN
Incident Summary: SOURCE UNKNOWN - OIL SHEEN ON SCUGOG R. FROM UNKNOWN SOURCE.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

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51 | ***1 of 1*** | ***WNW/144.4*** | ***264.8 / 18.00*** | ***ON*** | ***WWIS***

Well ID:	6401734	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Livestock	**Data Entry Status:**	
Use 2nd:	Irrigation	**Data Src:**	1
Final Well Status:	Water Supply	**Date Received:**	07-Jan-1958 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:		**Contractor:**	2516
Tag:		**Form Version:**	1
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	LINDSAY TOWN		

Site Info:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/640\6401734.pdf

Additional Detail(s) (Map)

Well Completed Date: 1957/12/07
Year Completed: 1957
Depth (m): 11.5824
Latitude: 44.3624463348255
Longitude: -78.741932910057
Path: 640\6401734.pdf

Bore Hole Information

Bore Hole ID:	10436765	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	679933.90
Code OB Desc:		**North83:**	4914610.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	07-Dec-1957 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	p9

Loc Method Desc: Original Pre1985 UTM Rel Code 9: unknown UTM
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 932492380
Layer: 2
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 19.0
Formation End Depth: 38.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932492379
Layer: 1
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 19.0
Formation End Depth UOM: ft

Method of Construction & Well

Use

Method Construction ID: 966401734
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 10985335
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930713438
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 19.0
Casing Diameter: 7.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930713439
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 38.0
Casing Diameter: 7.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pumping Test Method Desc: PUMP
Pump Test ID: 996401734
Pump Set At:
Static Level: 17.0
Final Level After Pumping: 21.0
Recommended Pump Depth:
Pumping Rate: 10.0
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 2
Pumping Duration MIN: 0
Flowing: No

Water Details

Water ID: 933923788
Layer: 1

Kind Code: 1
Kind: FRESH
Water Found Depth: 38.0
Water Found Depth UOM: ft

Links

Bore Hole ID: 10436765
Depth M: 11.5824
Year Completed: 1957
Well Completed Dt: 1957/12/07
Audit No:
Tag No:
Contractor: 2516
Path: 640\6401734.pdf
Latitude: 44.3624463348255
Longitude: -78.741932910057

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52 | ***1 of 10*** | ***SSW/151.0*** | ***253.6 / 6.75*** | ***3176461 CANADA INC., NEXACOR REALTY***
91 WILLIAM STREET NORTH
LINDSAY ON K9V 4A4 | ***CA***

Certificate #: 8-4161-98-
Application Year: 98
Issue Date: //
Approval Type: Industrial air
Status: In progress
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description: EMERGENCY POWER FOR BELL TELECOM NETWORK
Contaminants:
Emission Control:

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52 | ***2 of 10*** | ***SSW/151.0*** | ***253.6 / 6.75*** | ***BELL CANADA***
91 WILLIAM STREET NORTH
LINDSAY ON K9V 4A4 | ***GEN***

Generator No: ON0473747
SIC Code: 3351
SIC Description: TELECOMMUNICATIONS
Approval Years: 97,98,99,00
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 121
Waste Class Name: ALKALINE WASTES - HEAVY METALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

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52 | ***3 of 10*** | ***SSW/151.0*** | ***253.6 / 6.75*** | ***BELL (OUT OF BUSINESS)***
91 WILLIAM STREET NORTH
LINDSAY ON K9V 4A4 | ***GEN***

Generator No: ON0473747

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

SIC Code: 4821
SIC Description: TELECOMMUN. CARRRIERS
Approval Years: 01
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 121
Waste Class Name: ALKALINE WASTES - HEAVY METALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

52	4 of 10	SSW/151.0	253.6 / 6.75	**Bell Canada** **William St 91, Lindsay ON** **LINDSAY ON**	DTNK

Delisted Commercial Fuel Oil Tanks

Licence No:
Registration No: 200204-1578
Posse File No:
Posse Reg No:
Instance No:
Status Name:
Tank Type:
Tank Size: 10002 L
Tank Material: Fiberglass reinforced plastic
Tk Age(as of 05/1992): 11 yrs
Tank Address: William St 91, Lindsay ON
Instance Type:
Instance Creation Dt:
Instance Install Dt:
Item:
Item Desc:
Device Instld Loc:
Description:
Original Source: CFOT
Record Date: Up to Apr 2013

Facility Type:
Fuel Type:
Corrosion Protection:
NBR:
Contact Name: c/o Alain Naud
Contact Address: 3685 Aylmer - Bureau 200
Contact Address2:
Contact Suite:
Contact City: Montreal
Contact Prov: QC
Contact Postal: H2X 2C5
Province:
Letter Sent:
Context:
Distributor: Esso
Comments:

52	5 of 10	SSW/151.0	253.6 / 6.75	**Bell Canada** **91 Williams Street** **Lindsay ON**	GEN

Generator No: ON9892171
SIC Code: 517110, 517210, 517510
SIC Description: Wired Telecommunications Carriers, Wireless Telecommunications Carriers (except Satellite), Cable and Other Program Distribution
Approval Years: 2009
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 121
Waste Class Name: ALKALINE WASTES - HEAVY METALS

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52 | ***6 of 10*** | ***SSW/151.0*** | ***253.6 / 6.75*** | ***Bell Canada, 91 Williams Street, Lindsay ON*** | ***GEN***

Generator No: ON9892171
SIC Code: 517110, 517210, 517510
SIC Description: Wired Telecommunications Carriers, Wireless Telecommunications Carriers (except Satellite), Cable and Other Program Distribution
Approval Years: 2010
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 121
Waste Class Name: ALKALINE WASTES - HEAVY METALS

Waste Class: 221
Waste Class Name: LIGHT FUELS

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52 | ***7 of 10*** | ***SSW/151.0*** | ***253.6 / 6.75*** | ***Bell Canada, 91 Williams Street, Lindsay ON*** | ***GEN***

Generator No: ON9892171
SIC Code: 517110, 517210, 517510
SIC Description: Wired Telecommunications Carriers, Wireless Telecommunications Carriers (except Satellite), Cable and Other Program Distribution
Approval Years: 2011
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 221

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Waste Class Name: LIGHT FUELS

Waste Class: 121
Waste Class Name: ALKALINE WASTES - HEAVY METALS

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52 | **8 of 10** | **SSW/151.0** | **253.6 / 6.75** | **Bell Canada**
91 Williams Street
Lindsay ON | **GEN**

Generator No: ON9892171
SIC Code: 517110, 517210, 517510
SIC Description: Wired Telecommunications Carriers, Wireless Telecommunications Carriers (except Satellite), Cable and Other Program Distribution
Approval Years: 2012
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 121
Waste Class Name: ALKALINE WASTES - HEAVY METALS

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

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52 | **9 of 10** | **SSW/151.0** | **253.6 / 6.75** | **Bell Canada**
91 Williams Street
Lindsay ON | **GEN**

Generator No: ON9892171
SIC Code: 517110, 517210, 517510
SIC Description: WIRED TELECOMMUNICATIONS CARRIERS, WIRELESS TELECOMMUNICATIONS CARRIERS (EXCEPT SATELLITE)
Approval Years: 2013
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 121
Waste Class Name: ALKALINE WASTES - HEAVY METALS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 221
Waste Class Name: LIGHT FUELS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
52	10 of 10	SSW/151.0	253.6 / 6.75	Bell Canada 91 Williams Street Lindsay ON K9V 4A4	GEN

Generator No: ON9892171
SIC Code:
SIC Description:
Approval Years: As of Oct 2022
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 221 L
Waste Class Name: LIGHT FUELS

Waste Class: 121 C
Waste Class Name: ALKALINE WASTES - HEAVY METALS

Waste Class: 251 L
Waste Class Name: OIL SKIMMINGS & SLUDGES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
53	1 of 1	SE/151.7	252.8 / 6.00	ON	WWIS

Well ID: 7282494
Construction Date:
Use 1st:
Use 2nd:
Final Well Status:
Water Type:
Casing Material:
Audit No: C35148
Tag: A206777
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: OPS TOWNSHIP
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status: Yes
Data Src:
Date Received: 02-Mar-2017 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7215
Form Version: 8
Owner:
County: VICTORIA
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2016/11/25
Year Completed: 2016
Depth (m):
Latitude: 44.3579701463599
Longitude: -78.7354781489441
Path:

Bore Hole Information

Bore Hole ID:	1006362333	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	680462.00
Code OB Desc:		***North83:***	4914127.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	25-Nov-2016 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Links

Bore Hole ID:	1006362333	***Tag No:***	A206777
Depth M:		***Contractor:***	7215
Year Completed:	2016	***Path:***	
Well Completed Dt:	2016/11/25	***Latitude:***	44.3579701463599
Audit No:	C35148	***Longitude:***	-78.7354781489441

54 ***1 of 1*** ***E/153.4*** ***255.5 / 8.62*** ***ON*** ***WWIS***

Well ID:	6407424	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Domestic	***Data Entry Status:***	
Use 2nd:	0	***Data Src:***	1
Final Well Status:	Water Supply	***Date Received:***	14-Feb-1978 00:00:00
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:		***Contractor:***	2518
Tag:		***Form Version:***	1
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	VICTORIA
Elevatn Reliabilty:		***Lot:***	
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	LINDSAY TOWN		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/640\6407424.pdf

Additional Detail(s) (Map)

Well Completed Date:	1977/04/23
Year Completed:	1977
Depth (m):	10.3632
Latitude:	44.3619317931433
Longitude:	-78.7327779920042
Path:	640\6407424.pdf

Bore Hole Information

Bore Hole ID:	10442406	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	680665.00
Code OB Desc:		***North83:***	4914573.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	5
Date Completed:	23-Apr-1977 00:00:00	***UTMRC Desc:***	margin of error : 100 m - 300 m
Remarks:		***Location Method:***	p5

Loc Method Desc: Original Pre1985 UTM Rel Code 5: margin of error : 100 m - 300 m
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 932509630
Layer: 2
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 2.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932509629
Layer: 1
Color:
General Color:
Mat1: 02
Most Common Material: TOPSOIL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 2.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932509631
Layer: 3
Color:
General Color:
Mat1: 28

Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	30.0
Formation End Depth:	34.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966407424
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	10990976
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930722062
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	34.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pumping Test Method Desc:	BAILER
Pump Test ID:	996407424
Pump Set At:	
Static Level:	6.0
Final Level After Pumping:	22.0
Recommended Pump Depth:	
Pumping Rate:	8.0
Flowing Rate:	
Recommended Pump Rate:	8.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	2
Pumping Duration HR:	2
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934323521
Test Type:	Recovery
Test Duration:	15
Test Level:	6.0

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934596042
Test Type: Recovery
Test Duration: 30
Test Level: 6.0
Test Level UOM: ft

Water Details

Water ID: 933929275
Layer: 1
Kind Code: 5
Kind: Not stated
Water Found Depth: 33.0
Water Found Depth UOM: ft

Links

Bore Hole ID: 10442406
Depth M: 10.3632
Year Completed: 1977
Well Completed Dt: 1977/04/23
Audit No:
Tag No:
Contractor: 2518
Path: 640\6407424.pdf
Latitude: 44.3619317931433
Longitude: -78.7327779920042

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55 | ***1 of 1*** | ***NW/157.1*** | ***257.7 / 10.83*** | ***ALBERT ADAM DE SMIT 4 ELGIN ST,,LINDSAY,ON,K9V 3V8,CA ON*** | ***PINC***

Incident Id:
Incident No: 1953466
Incident Reported Dt: 10/3/2016
Type: FS-Pipeline Incident
Status Code:
Tank Status: Pipeline Damage Reason Est
Task No:
Spills Action Centre:
Fuel Type:
Fuel Occurrence Tp:
Date of Occurrence:
Occurrence Start Dt:
Depth:
Customer Acct Name: ALBERT ADAM DE SMIT
Incident Address: 4 ELGIN ST,,LINDSAY,ON,K9V 3V8,CA
Operation Type:
Pipeline Type:
Regulator Type:
Summary:
Reported By:
Affiliation:
Occurrence Desc:
Damage Reason:
Notes:
Pipe Material:
Fuel Category:
Health Impact:
Environment Impact:
Property Damage:
Service Interrupt:
Enforce Policy:
Public Relation:
Pipeline System:
PSIG:
Attribute Category:
Regulator Location:
Method Details:

---

56 | ***1 of 2*** | ***W/161.7*** | ***264.8 / 17.92*** | ***DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT 33 REGENT ST,,LINDSAY,ON,K9V 3T9,CA ON*** | ***PINC***

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Incident Id:		**Pipe Material:**	
Incident No:	1743736	**Fuel Category:**	
Incident Reported Dt:	10/23/2015	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	
Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:		**Enforce Policy:**	
Spills Action Centre:		**Public Relation:**	
Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	
Occurrence Start Dt:		**Regulator Location:**	
Depth:		**Method Details:**	

Customer Acct Name: DO NOT USE SEE-P0116383 3414493 CANADA INC (6 JOHN) C/O CAP REIT
Incident Address: 33 REGENT ST,,LINDSAY,ON,K9V 3T9,CA
Operation Type:
Pipeline Type:
Regulator Type:
Summary:
Reported By:
Affiliation:
Occurrence Desc:
Damage Reason:
Notes:

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56 | ***2 of 2*** | ***W/161.7*** | ***264.8 / 17.92*** | ***Enbridge Gas Distribution Inc.*** | ***SPL***
33 regent st, lindsay
Kawartha Lakes ON

Ref No:	3468-A3KPJF	**Contaminant Qty:**	0 other - see incident description
Site No:	NA	**Nature of Damage:**	
Incident Dt:	10/23/2015	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	
Incident Event:		**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	10/23/2015	**Northing:**	
Dt Document Closed:	11/27/2015	**Easting:**	

Municipality No:
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code: 35
Contaminant Name: NATURAL GAS (METHANE)
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium:
Receiving Environment:
Incident Reason: Operator/Human Error
Incident Summary: TSSA: Regent St service damage
Site Region:
Site Municipality: Kawartha Lakes
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Miscellaneous Industrial
SAC Action Class: TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill
Source Type:
Site County/District:
Site Geo Ref Meth:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Site District Office:
Nearest Watercourse:
Site Name: pipeline<UNOFFICIAL>
Site Address: 33 regent st, lindsay

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57 | **1 of 1** | **SE/169.5** | **254.4 / 7.56** | **DISCOUNT BAIT & TACKLE**
10 QUEEN ST
LINDSAY ON K9V 1E9 | **SCT**

Established: 1992
Plant Size (ft²): 0
Employment: 2

--Details--
Description: Sporting and Athletic Goods Manufacturing
SIC/NAICS Code: 339920

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58 | **1 of 1** | **SE/170.6** | **252.8 / 6.00** | **Canadian Addiction Treatment Clinics LP**
40 Lindsay Street
Lindsay ON K9V 2L8 | **GEN**

Generator No: ON9698129
SIC Code:
SIC Description:
Approval Years: As of Oct 2022
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 312 P
Waste Class Name: PATHOLOGICAL WASTES

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59 | **1 of 1** | **NW/172.7** | **259.8 / 13.00** | **6 Elgin St**
Kawartha Lakes ON | **SPL**

Ref No: 8533-AEDMDM
Site No: NA
Incident Dt: 10/3/2016
Year:
Incident Cause:
Incident Event: Leak/Break
Environment Impact:
Nature of Impact:
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 10/3/2016
Dt Document Closed:
Municipality No:
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code: 35
Contaminant Name: METHANE GAS, COMPRESSED (NATURAL GAS)
Contaminant Qty: 1 number (count)
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved:
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium:
Receiving Environment: Air
Incident Reason: Operator/Human Error
Incident Summary: TSSA: 6 Elgin st line strike made safe
Site Region:
Site Municipality: Kawartha Lakes
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Miscellaneous Communal
SAC Action Class: Air Spills - Gases and Vapours
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name: tssa<UNOFFICIAL>
Site Address: 6 Elgin St

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60 | **1 of 2** | **S/177.7** | **247.2 / 0.41** | **MANLEY MOTORS LTD**
76 WILLIAM ST N
LINDSAY ON K9V 4A5 | **PRT**

Location ID: 7686
Type: private
Expiry Date: 1994-08-31
Capacity (L): 0.00
Licence #: 0037133001

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60 | **2 of 2** | **S/177.7** | **247.2 / 0.41** | **76 William Street North**
Lindsay ON K9V 4A5 | **EHS**

Order No: 20190827108
Status: C
Report Type: RSC Report (Urban)
Report Date: 03-SEP-19
Date Received: 27-AUG-19
Previous Site Name:
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans; Aerial Photos

Nearest Intersection:
Municipality: City of Kawartha Lakes
Client Prov/State: ON
Search Radius (km): .3
X: -78.737994
Y: 44.357977

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61 | **1 of 1** | **SSE/178.5** | **251.8 / 4.96** | **29 Lindsay Street North**
Lindsay ON | **EHS**

Order No: 20150811111
Status: C
Report Type: Standard Report
Report Date: 18-AUG-15
Date Received: 11-AUG-15
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:

Nearest Intersection:
Municipality: Lindsay, City of Kawartha Lakes
Client Prov/State: ON
Search Radius (km): .25
X: -78.735925
Y: 44.357603

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62 | **1 of 1** | **S/182.6** | **246.7 / -0.10** | **ON** | **WWIS**

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Well ID:	7356194	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	31-Mar-2020 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	C43292	**Contractor:**	7654
Tag:	A253350	**Form Version:**	8
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	LINDSAY TOWN		
Site Info:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	
Year Completed:	
Depth (m):	
Latitude:	44.3577337819699
Longitude:	-78.7376330103099
Path:	

Bore Hole Information

Bore Hole ID:	1008225633	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680291.00
Code OB Desc:		**North83:**	4914096.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:		**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Loc Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Links

Bore Hole ID:	1008225633	**Tag No:**	A253350
Depth M:		**Contractor:**	7654
Year Completed:		**Path:**	
Well Completed Dt:		**Latitude:**	44.3577337819699
Audit No:	C43292	**Longitude:**	-78.7376330103099

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
63	1 of 1	SE/185.5	252.0 / 5.18	LINDSAY STREET NORTH LINDSAY ON	WWIS

Well ID:	7274058	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	28-Oct-2016 00:00:00
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z230984	**Contractor:**	7323
Tag:	A129480	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	VICTORIA
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	LINDSAY TOWN		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/727\7274058.pdf

Additional Detail(s) (Map)

Well Completed Date:	2016/09/09
Year Completed:	2016
Depth (m):	9.144
Latitude:	44.3576460452378
Longitude:	-78.7354780897853
Path:	727\7274058.pdf

Bore Hole Information

Bore Hole ID:	1006281127	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	680463.00
Code OB Desc:		**North83:**	4914091.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	5
Date Completed:	09-Sep-2016 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	gis
Loc Method Desc:	from gis		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1006454769
Layer:	3
Color:	2
General Color:	GREY
Mat1:	27
Most Common Material:	OTHER
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	

Mat3 Desc:
Formation Top Depth: 5.0
Formation End Depth: 8.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006454771
Layer: 5
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2: 05
Mat2 Desc: CLAY
Mat3: 26
Mat3 Desc: ROCK
Formation Top Depth: 14.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006454768
Layer: 2
Color: 6
General Color: BROWN
Mat1: 01
Most Common Material: FILL
Mat2: 06
Mat2 Desc: SILT
Mat3: 15
Mat3 Desc: LIMESTONE
Formation Top Depth: 3.0
Formation End Depth: 5.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006454770
Layer: 4
Color: 6
General Color: BROWN
Mat1: 01
Most Common Material: FILL
Mat2: 06
Mat2 Desc: SILT
Mat3: 15
Mat3 Desc: LIMESTONE
Formation Top Depth: 8.0
Formation End Depth: 14.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006454767
Layer: 1
Color: 6

General Color:	BROWN
Mat1:	01
Most Common Material:	FILL
Mat2:	02
Mat2 Desc:	TOPSOIL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	3.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1006454780
Layer:	1
Plug From:	1.0
Plug To:	18.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1006454781
Layer:	2
Plug From:	18.0
Plug To:	29.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1006454779
Method Construction Code:	6
Method Construction:	Boring
Other Method Construction:	AIR PERCUSSION

Pipe Information

Pipe ID:	1006454766
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1006454775
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	18.0
Casing Diameter:	1.5
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1006454776
Layer:	1
Slot:	.10

Screen Top Depth:	18.0
Screen End Depth:	28.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	1.75

Water Details

Water ID:	1006454774
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1006454772
Diameter:	8.0
Depth From:	0.0
Depth To:	14.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1006454773
Diameter:	4.0
Depth From:	14.0
Depth To:	28.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Links

Bore Hole ID:	1006281127	**Tag No:**	A129480
Depth M:	9.144	**Contractor:**	7323
Year Completed:	2016	**Path:**	727\7274058.pdf
Well Completed Dt:	2016/09/09	**Latitude:**	44.3576460452378
Audit No:	Z230984	**Longitude:**	-78.7354780897853

64 ***1 of 1*** ***WSW/201.3*** ***261.9 / 15.05*** ***VICTORIA, COUNTY OF***
28 FRANCIS STREET (SITE RR #2)
LINDSAY ON K9V 6H7 ***GEN***

Generator No:	ON0293700
SIC Code:	6359
SIC Description:	OTHER VEH. REPAIR
Approval Years:	86,87,88
PO Box No:	
Country:	
Status:	
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Detail(s)

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
Waste Class:		252			
Waste Class Name:		WASTE OILS & LUBRICANTS			
65	1 of 3	SSW/204.4	252.9 / 6.03	GARRY'S TREE SERVICE LTD. 85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	GEN
Generator No:		ON0698600			
SIC Code:		0511			
SIC Description:		FOREST SERVICES			
Approval Years:		86,87,88			
PO Box No:					
Country:					
Status:					
Co Admin:					
Choice of Contact:					
Phone No Admin:					
Contaminated Facility:					
MHSW Facility:					
Detail(s)					
Waste Class:		213			
Waste Class Name:		PETROLEUM DISTILLATES			
65	2 of 3	SSW/204.4	252.9 / 6.03	GARRY'S (OUT OF BUSINESS) 85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	GEN
Generator No:		ON0698600			
SIC Code:		0511			
SIC Description:		FOREST SERVICES			
Approval Years:		89,90			
PO Box No:					
Country:					
Status:					
Co Admin:					
Choice of Contact:					
Phone No Admin:					
Contaminated Facility:					
MHSW Facility:					
Detail(s)					
Waste Class:		213			
Waste Class Name:		PETROLEUM DISTILLATES			
65	3 of 3	SSW/204.4	252.9 / 6.03	GARRY'S (OUT OF BUSINESS) 16-140 85 WILLIAM ST. N. C/O 351 KENT ST. W. LINDSAY ON K9V 4A4	GEN
Generator No:		ON0698600			
SIC Code:		0511			
SIC Description:		FOREST SERVICES			
Approval Years:		92,93,94,95,96,97,98			
PO Box No:					
Country:					
Status:					
Co Admin:					
Choice of Contact:					
Phone No Admin:					
Contaminated Facility:					

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
MHSW Facility:					
66	1 of 1	S/211.7	252.2 / 5.39	2000 LINDSAY ST N ON	WWIS

Well ID: 7319937
Construction Date:
Use 1st: Test Hole
Use 2nd: Monitoring
Final Well Status: Observation Wells
Water Type:
Casing Material:
Audit No: Z288947
Tag: A249431
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: LINDSAY TOWN
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 18-Sep-2018 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7247
Form Version: 7
Owner:
County: VICTORIA
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2018/06/11
Year Completed: 2018
Depth (m): 6.096
Latitude: 44.357866876577
Longitude: -78.73844352547
Path:

Bore Hole Information

Bore Hole ID: 1007296409
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 11-Jun-2018 00:00:00
Remarks:
Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 680226.00
North83: 4914109.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1007536788
Layer: 1
Color:

General Color:	
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	0.5
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1007536790
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	34
Mat2 Desc:	TILL
Mat3:	05
Mat3 Desc:	CLAY
Formation Top Depth:	12.5
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1007536789
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	34
Mat2 Desc:	TILL
Mat3:	84
Mat3 Desc:	SILTY
Formation Top Depth:	0.5
Formation End Depth:	12.5
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007536798
Layer:	1
Plug From:	0.0
Plug To:	13.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1007536797
Method Construction Code:	2
Method Construction:	Rotary (Convent.)
Other Method Construction:	

Pipe Information

Pipe ID:	1007536787
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007536793
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	15.0
Casing Diameter:	2.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1007536794
Layer:	1
Slot:	10
Screen Top Depth:	15.0
Screen End Depth:	20.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	2.125

Water Details

Water ID:	1007536792
Layer:	1
Kind Code:	8
Kind:	Untested
Water Found Depth:	12.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1007536791
Diameter:	6.0
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Links

Bore Hole ID:	1007296409	***Tag No:***	A249431
Depth M:	6.096	***Contractor:***	7247
Year Completed:	2018	***Path:***	731\7319937.pdf
Well Completed Dt:	2018/06/11	***Latitude:***	44.357866876577
Audit No:	Z288947	***Longitude:***	-78.73844352547

67	***1 of 2***	***W/216.1***	***265.9 / 19.06***	***ACCUREX INC*** ***41 REGENT ST,,LINDSAY,ON,K9V 3T9,CA*** ***ON***	***PINC***

Incident Id:		**Pipe Material:**	
Incident No:	1756728	**Fuel Category:**	
Incident Reported Dt:	11/17/2015	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	
Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:		**Enforce Policy:**	
Spills Action Centre:		**Public Relation:**	
Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	
Occurrence Start Dt:		**Regulator Location:**	
Depth:		**Method Details:**	

Customer Acct Name: ACCUREX INC
Incident Address: 41 REGENT ST,,LINDSAY,ON,K9V 3T9,CA
Operation Type:
Pipeline Type:
Regulator Type:
Summary:
Reported By:
Affiliation:
Occurrence Desc:
Damage Reason:
Notes:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
67	2 of 2	W/216.1	265.9 / 19.06	Enbridge Gas Distribution Inc. 41 Regent St Lindsay Kawartha Lakes ON	SPL

Ref No:	7768-A4BS2Y	**Contaminant Qty:**	0 other - see incident description
Site No:	NA	**Nature of Damage:**	
Incident Dt:	11/16/2015	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:		**Health/Env Conseq:**	
Incident Event:		**Agency Involved:**	
Environment Impact:		**Site Lot:**	
Nature of Impact:		**Site Conc:**	
MOE Response:	No	**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	11/16/2015	**Northing:**	
Dt Document Closed:		**Easting:**	
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			

Contaminant Code: 35
Contaminant Name: NATURAL GAS (METHANE)
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium:
Receiving Environment:
Incident Reason: Operator/Human Error
Incident Summary: TSSA- 1/2" plastic line Strike, Made Safe, City of Kawartha Lakes
Site Region:
Site Municipality: Kawartha Lakes
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Miscellaneous Industrial
SAC Action Class: TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill
Source Type:
Site County/District:
Site Geo Ref Meth:

Site District Office:
Nearest Watercourse:
Site Name: Private Residence<UNOFFICIAL>
Site Address: 41 Regent St Lindsay

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68 | 1 of 1 | S/224.1 | 246.6 / -0.20 | ON | WWIS

Well ID: 7338168
Construction Date:
Use 1st:
Use 2nd:
Final Well Status:
Water Type:
Casing Material:
Audit No: C42231
Tag: A244578
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: LINDSAY TOWN
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status: Yes
Data Src:
Date Received: 26-Jul-2019 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7464
Form Version: 8
Owner:
County: VICTORIA
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date: 2019/04/17
Year Completed: 2019
Depth (m):
Latitude: 44.3572620187876
Longitude: -78.7374504013334
Path:

Bore Hole Information

Bore Hole ID: 1007562024
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 17-Apr-2019 00:00:00
Remarks:
Loc Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 680307.00
North83: 4914044.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Links

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Bore Hole ID:	1007562024	**Tag No:**	A244578
Depth M:		**Contractor:**	7464
Year Completed:	2019	**Path:**	
Well Completed Dt:	2019/04/17	**Latitude:**	44.3572620187876
Audit No:	C42231	**Longitude:**	-78.7374504013334

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69 | **1 of 1** | **SE/226.6** | **254.8 / 8.00** | **PART LOTS 5 & 6, NORTH OF KING ST LINDSAY ON K9V1G1** | **EHS**

Order No:	20090826004	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	9/3/2009	**Search Radius (km):**	0.25
Date Received:	8/26/2009	**X:**	-78.734113
Previous Site Name:		**Y:**	44.357825
Lot/Building Size:			
Additional Info Ordered:			

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70 | **1 of 2** | **SSW/228.5** | **252.9 / 6.03** | **77 to 83 William Street North Lindsay ON K9V 4A4** | **EHS**

Order No:	22080200605	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	RSC Report (Urban)	**Client Prov/State:**	ON
Report Date:	05-AUG-22	**Search Radius (km):**	.3
Date Received:	02-AUG-22	**X:**	-78.73862808
Previous Site Name:		**Y:**	44.35778807
Lot/Building Size:			
Additional Info Ordered:	City Directory		

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70 | **2 of 2** | **SSW/228.5** | **252.9 / 6.03** | **77 to 83 William Street North Lindsay ON K9V 4A4** | **EHS**

Order No:	22080200605	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	RSC Report (Urban)	**Client Prov/State:**	ON
Report Date:	05-AUG-22	**Search Radius (km):**	.3
Date Received:	02-AUG-22	**X:**	-78.73862808
Previous Site Name:		**Y:**	44.35778807
Lot/Building Size:			
Additional Info Ordered:	City Directory		

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71 | **1 of 1** | **S/229.2** | **253.5 / 6.64** | **CONSUMERS' GAS CO. LTD., THE WILLIAMS ST/WELLINGTON ST. NATURAL GAS PIPELINE LINDSAY TOWN ON** | **SPL**

Ref No:	119698	**Contaminant Qty:**	
Site No:		**Nature of Damage:**	
Incident Dt:	10/16/1995	**Discharger Report:**	
Year:		**Material Group:**	
Incident Cause:	VALVE/FITTING LEAK OR FAILURE	**Health/Env Conseq:**	
Incident Event:		**Agency Involved:**	FD, PD.
Environment Impact:	POSSIBLE	**Site Lot:**	
Nature of Impact:	Air Pollution	**Site Conc:**	
MOE Response:		**Site Geo Ref Accu:**	
Dt MOE Arvl on Scn:		**Site Map Datum:**	
MOE Reported Dt:	10/16/1995	**Northing:**	
Dt Document Closed:		**Easting:**	
Municipality No:	72401		

System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: AIR
Receiving Environment:
Incident Reason: ERROR
Incident Summary: CONSUMERS GAS-NATURAL GASLEAK FRM 8" PIPE STOPPED.EVACUATION ENDED.F/D, F/D
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

72	*1 of 5*	*S/230.8*	*251.6 / 4.75*	***LINDSAY HYDRO ELECTRIC SYSTEM*** ***66 WILLIAM ST., NORTH C/O BOX 598*** ***LINDSAY ON K9V 4A2***	***GEN***

Generator No: ON0863100
SIC Code: 4911
SIC Description: ELECT. POWER SYS.
Approval Years: 86,87
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

72	*2 of 5*	*S/230.8*	*251.6 / 4.75*	***LINDSAY HYDRO (OUT OF BUSINESS)*** ***66 WILLIAM ST., NORTH C/O BOX 598*** ***LINDSAY ON K9V 4A2***	***GEN***

Generator No: ON0863100
SIC Code: 4911
SIC Description: ELECT. POWER SYS.

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Approval Years: 88,89,90
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
72	3 of 5	S/230.8	251.6 / 4.75	LINDSAY HYDRO (OUT OF BUSINESS) 24-372 66 WILLIAM ST., NORTH C/O BOX 598 LINDSAY ON K9V 4A2	GEN

Generator No: ON0863100
SIC Code: 4911
SIC Description: ELECT. POWER SYS.
Approval Years: 92,93,94,95,96,97,98
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
72	4 of 5	S/230.8	251.6 / 4.75	66 William St. N. Lindsay ON K9V 4A2	EHS

Order No: 20060529016
Status: C
Report Type: Complete Report
Report Date: 6/7/2006
Date Received: 5/29/2006
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:

Nearest Intersection: at Wellington
Municipality: City of Kawartha Lake
Client Prov/State: ON
Search Radius (km): 0.25
X: -78.737714
Y: 44.357317

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
72	5 of 5	S/230.8	251.6 / 4.75	66 Williams St N Lindsay ON	EHS

Order No: 20081113012
Status: C
Report Type: Site Report
Report Date: 11/14/2008
Date Received: 11/13/2008
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:

Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): 0.25
X: -78.737683
Y: 44.357408

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
73	1 of 3	SSW/231.5	251.7 / 4.84	77-83 William St N, Lindsay Lindsay ON K9V 4A4	EHS

Order No:	21070200047	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	07-JUL-21	**Search Radius (km):**	.25
Date Received:	02-JUL-21	**X:**	-78.73864188
Previous Site Name:		**Y:**	44.35775957
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans; Aerial Photos		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
73	2 of 3	SSW/231.5	251.7 / 4.84	77-83 William St N, Lindsay Lindsay ON K9V 4A4	EHS

Order No:	21070200047	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	07-JUL-21	**Search Radius (km):**	.25
Date Received:	02-JUL-21	**X:**	-78.73864188
Previous Site Name:		**Y:**	44.35775957
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans; Aerial Photos		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
73	3 of 3	SSW/231.5	251.7 / 4.84	77-83 William St N, Lindsay Lindsay ON K9V 4A4	EHS

Order No:	21070200047	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	07-JUL-21	**Search Radius (km):**	.25
Date Received:	02-JUL-21	**X:**	-78.73864188
Previous Site Name:		**Y:**	44.35775957
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans; Aerial Photos		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
74	1 of 2	SSW/247.0	252.9 / 6.03	36 Wellington Street Lindsay ON K9V 3N3	EHS

Order No:	20100531023	**Nearest Intersection:**	
Status:	C	**Municipality:**	Lindsay
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	6/9/2010	**Search Radius (km):**	0.25
Date Received:	5/31/2010	**X:**	-78.739496
Previous Site Name:		**Y:**	44.357235
Lot/Building Size:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
74	2 of 2	SSW/247.0	252.9 / 6.03	Mark Pagavathsing 36 WELLINGTON ST, KAWARTHA LAKES, ON, K9V 3N3 ON K9V 3N3	RSC

RSC ID:	88715	**Cert Date:**	7-Jun-10
RA No:		**Cert Prop Use No:**	No CPU
RSC Type:		**Intended Prop Use:**	Residential
Curr Property Use:	Commercial	**Qual Person Name:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Ministry District:	KAWARTHA LAKES	***Stratified (Y/N):***	
Filing Date:	15-Oct-10	***Audit (Y/N):***	
Date Ack:		***Entire Leg Prop. (Y/N):***	Yes
Date Returned:		***Accuracy Estimate:***	0 to 1 meters
Restoration Type:		***Telephone:***	416-2197097
Soil Type:		***Fax:***	905-4711481
Criteria:		***Email:***	markpaga@hotmail.com
CPU Issued Sect 1686:	No		

Asmt Roll No:	16 51 010 002 09700
Prop ID No (PIN):	63222-0039 (LT)
Property Municipal Address:	36 WELLINGTON ST, KAWARTHA LAKES, ON, K9V 3N3
Mailing Address:	107 PURVIS CRES, SCARBOROUGH, ON, M1B 1H8
Latitude & Latitude:	44.35744150N 78.73948570W
UTM Coordinates:	NAD83 17-680144-4914059 (converted from Latitude & Longitude)
Consultant:	
Legal Desc:	PT of Lot 8, north of Wellingtion Street, PL Town Plot, in the Former Town of Lindsay, City of Kawartha Lakes, As described in Instrument No. R312604.
Measurement Method:	Digitized from a satellite image
Applicable Standards:	Full Depth Site Conditions Standard, with Potable Ground Water, Coarse Textured Soil, for Residential/Parkland/Institutional property use
RSC PDF:	

75	***1 of 1***	***S/249.1***	***251.6 / 4.75***	***46-64, & 66 William Street North Lindsay ON K9V 4A2***	***EHS***

Order No:	20190402025	***Nearest Intersection:***	
Status:	C	***Municipality:***	City of Kawartha Lakes
Report Type:	RSC Report (Rural)	***Client Prov/State:***	ON
Report Date:	05-APR-19	***Search Radius (km):***	.3
Date Received:	02-APR-19	***X:***	-78.737636
Previous Site Name:		***Y:***	44.357072
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans; Aerial Photos		

Unplottable Summary

Total: 41 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal
CA	AUDEN PARK HOMES	ELGIN STREET	LINDSAY TOWN ON	
CA	LINDSAY TOWN	COLBORNE ST. WEST SEWAGE P.S.	LINDSAY TOWN ON	
CA	LINDSAY TOWN	LINDSAY ST. WPCP	LINDSAY TOWN ON	
CA	LINDSAY WATER & SEWER COMMISSION	COLBORNE ST.W. SEWAGE P.S.	LINDSAY TOWN ON	
CA	LINDSAY WATER & SEWER COMMISSION	COLBORNE ST. E., SCUGOG RIVER	LINDSAY TOWN ON	
CA		Parts of Lot 21 and 22, Concession 6	Kawartha Lakes ON	
CA	LINDSAY TOWN	COLBORNE ST. WEST SEWAGE P.S.	LINDSAY TOWN ON	
CA	LINDSAY TOWN	LINDSAY ST. SEWAGE PUMP STA.	LINDSAY TOWN ON	
CA	LINDSAY TOWN	WILLIAM STREET NORTH	LINDSAY TOWN ON	
CA	AUDEN PARK HOMES	ELGIN STREET	LINDSAY TOWN ON	
CA	LINDSAY TOWN	POTTINGER ST.	LINDSAY TOWN ON	
CA	LINDSAY TOWN	BOND STREET	LINDSAY TOWN ON	
ECA	The Corporation of the City of Kawartha Lakes	Lindsay Street North, Lindsay	Kawartha Lakes ON	K9V 5R8
ECA	The Corporation of the City of Kawartha Lakes	Bond St	Kawartha Lakes ON	K9V 5R8
ECA	The Corporation of the City of Kawartha Lakes	Elgin St	Kawartha Lakes ON	
ECA	The Corporation of the City of Kawartha Lakes	Queen St	Kawartha Lakes ON	K9V 3L8
ECA	The Corporation of the City of Kawartha Lakes	Bond St E	Kawartha Lakes ON	K9V 5R8

GEN	Bell Canada	VARIOUS BELL CANADA MANHOLES AND ACCESS CHAMBERS WITHIN THE MOE EASTERN REG.	(SEE SCHEDULE "B") ON	
GEN	The City of Kawartha Lakes Engineering	0 Colborne St	Lindsay ON	K9V 3V8
GEN	City of Kawartha Lakes	Colborne St.	Lindsay ON	
GEN	City of Kawartha Lakes	Colborne St.	Lindsay ON	K9V 3T5
PTTW	1078815 Ontario Inc.	Lindsay Street North Lindsay	ON	
SPL	ONTARIO HYDRO	LOT 21 CONCESSION 5 TRANSFORMER	LINDSAY TOWNSHIP ON	
SPL	PUC	SCUGOG RIVER LINDSAY ST N. PUMPING STATION INVALID SITE ENTRY - PLEASE USE ANOTHER	LINDSAY TOWN ON	
SPL	LAIDLAW TRANSPORT	COLBORNE STREET TRANSPORT TRUCK (CARGO)	LINDSAY TOWN ON	
SPL	UNKNOWN	LOWER SCUGOG RIVER LINDSAY STREET NORTH PUMPING STATION.	LINDSAY TOWN ON	
SPL	LAIDLAW TRANSPORT	FOR 1/4 MILE ALONG COLBORNE ST. MOTOR VEHICLE (OPERATING FLUID)	LINDSAY TOWN ON	
SPL	PUC	SCUGOG RIVER FROM THE LINDSAY ST. NORTH PUMPING STATION PUMPING STATION INVALID SITE ENTRY - PLEASE USE ANOTHER	LINDSAY TOWN ON	
SPL	LINDSAY, TOWN OF	SCUGOG RIVER COLBORNE STREET EAST SANITARY SEWER/PUMPING STATION	LINDSAY TOWN ON	
SPL	UNKNOWN	BOND STREET OUTFALL TO SCUGOG RIVER.	LINDSAY TOWN ON	
SPL	UNKNOWN	SCUGOG RIVER VIA BOND STREET OUTFALL	LINDSAY TOWN ON	
SPL	LAIDLAW CARRIERS INC.	COLBORNE ST EAST TO LINDSAY, SOUTH TO WELLINGTON, WEST TO WILLIAMS. MOTOR VEHICLE (OPERATING FLUID)	LINDSAY TOWN ON	
SPL	Royel Paving Limited	County Road 17	Kawartha Lakes ON	
SPL		SCUGOG RIVER AT COLBORNE ST., LINDSAY<UNOFFICIAL>	Kawartha Lakes ON	
SPL	LINDSAY, TOWN OF	LOWER SCUGOG RIVER LINDSAY STREET NORTH PUMPING STATION. SANITARY SEWER/PUMPING STATION	LINDSAY TOWN ON	
SPL	LINDSAY, TOWN OF	MANHOLE ON ST. PAUL STREET SANITARY SEWER/PUMPING STATION	KAWARTHA LAKES ON	
SPL	LINDSAY, TOWN OF	LOWER SCUGOG RIVER WELLINGTON ST. STN. LINDSAY WPCP	LINDSAY TOWN ON	

SPL	PUC	SCUGOG RIVER FROM THE LINDSAY ST. NORTH PUMPING STATION PUMPING STATION INVALID SITE ENTRY - PLEASE USE ANOTHER	LINDSAY TOWN ON
SPL	LINDSAY, TOWN OF	LOWER SCUGOG RIVER, WELLINGTON ST. STATION SANITARY SEWER/PUMPING STATION	LINDSAY TOWN ON
WDS	LINDSAY, TOWN OF	LINDSAY STREET NORTH	LINDSAY, TOWN OF ON
WWIS		lot 21 con 5	ON

Unplottable Report

Site: ***AUDEN PARK HOMES***
ELGIN STREET LINDSAY TOWN ON

Database: ***CA***

Certificate #:	7-0116-88-
Application Year:	88
Issue Date:	2/19/1988
Approval Type:	Municipal water
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

Site: ***LINDSAY TOWN***
COLBORNE ST. WEST SEWAGE P.S. LINDSAY TOWN ON

Database: ***CA***

Certificate #:	3-1228-96-
Application Year:	96
Issue Date:	7/7/1997
Approval Type:	Municipal sewage
Status:	
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

Site: ***LINDSAY TOWN***
LINDSAY ST. WPCP LINDSAY TOWN ON

Database: ***CA***

Certificate #:	3-1448-96-
Application Year:	96
Issue Date:	2/3/1997
Approval Type:	Municipal sewage
Status:	
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

Site: ***LINDSAY WATER & SEWER COMMISSION***
COLBORNE ST.W. SEWAGE P.S. LINDSAY TOWN ON

Database: ***CA***

Certificate #:	8-4105-99-

Application Year: 99
Issue Date: 12/29/1999
Approval Type: Industrial air
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description: 400KW STANDBY GENSET FOR SEWAGE P.S.
Contaminants:
Emission Control:

Site: ***LINDSAY WATER & SEWER COMMISSION***
COLBORNE ST. E., SCUGOG RIVER LINDSAY TOWN ON

Database: ***CA***

Certificate #: 7-0654-99-
Application Year: 99
Issue Date: 9/20/1999
Approval Type: Municipal water
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site:
Parts of Lot 21 and 22, Concession 6 Kawartha Lakes ON

Database: ***CA***

Certificate #: 2470-5EKKST
Application Year: 02
Issue Date: 10/3/02
Approval Type: Municipal & Private water
Status: Approved
Application Type: New Certificate of Approval
Client Name: The Corporation of the City of Kawartha Lakes
Client Address: 89 St. David Street
Client City: Kawartha Lakes
Client Postal Code:
Project Description: Approval is sought for the construction of watermains on Colborne Street and Caroline Street.
Contaminants:
Emission Control:

Site: ***LINDSAY TOWN***
COLBORNE ST. WEST SEWAGE P.S. LINDSAY TOWN ON

Database: ***CA***

Certificate #: 3-1228-96-
Application Year: 96
Issue Date: 10/23/1996
Approval Type: Municipal sewage
Status: Cancelled
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***LINDSAY TOWN***
LINDSAY ST. SEWAGE PUMP STA. LINDSAY TOWN ON

Database: ***CA***

Certificate #: 3-0038-94-
Application Year: 94
Issue Date: 2/25/1994
Approval Type: Municipal sewage
Status: Preliminary approval
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***LINDSAY TOWN***
WILLIAM STREET NORTH LINDSAY TOWN ON

Database: ***CA***

Certificate #: 7-0665-87-
Application Year: 87
Issue Date: 6/11/1987
Approval Type: Municipal water
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***AUDEN PARK HOMES***
ELGIN STREET LINDSAY TOWN ON

Database: ***CA***

Certificate #: 3-0098-88-
Application Year: 88
Issue Date: 2/19/1988
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***LINDSAY TOWN***
POTTINGER ST. LINDSAY TOWN ON

Database: ***CA***

Certificate #: 3-1792-87-
Application Year: 87
Issue Date: 10/21/1987
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:

Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***LINDSAY TOWN***
BOND STREET LINDSAY TOWN ON

Database: ***CA***

Certificate #: 3-0663-87-
Application Year: 87
Issue Date: 6/8/1987
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***The Corporation of the City of Kawartha Lakes***
Lindsay Street North, Lindsay Kawartha Lakes ON K9V 5R8

Database: ***ECA***

Approval No: 3761-9HJHQT
Approval Date: 2014-04-22
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the City of Kawartha Lakes
Address: Lindsay Street North, Lindsay
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/6041-9G3SDV-14.pdf
PDF Site Location:

Site: ***The Corporation of the City of Kawartha Lakes***
Bond St Kawartha Lakes ON K9V 5R8

Database: ***ECA***

Approval No: 4759-AAVQNB
Approval Date: 2016-06-14
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the City of Kawartha Lakes
Address: Bond St
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/7183-A8QHLR-14.pdf
PDF Site Location:

Site: ***The Corporation of the City of Kawartha Lakes***
Elgin St Kawartha Lakes ON

Database: ***ECA***

Approval No: 3336-A8LHL9
Approval Date: 2016-04-13
MOE District:
City:

Status:	Approved	***Longitude:***	
Record Type:	ECA	***Latitude:***	
Link Source:	IDS	***Geometry X:***	
SWP Area Name:		***Geometry Y:***	

Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the City of Kawartha Lakes
Address: Elgin St
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/9308-9WGHLV-14.pdf
PDF Site Location:

Site: ***The Corporation of the City of Kawartha Lakes***
Queen St Kawartha Lakes ON K9V 3L8

Database: ***ECA***

Approval No:	2705-7H4N83	***MOE District:***	
Approval Date:	2008-08-21	***City:***	
Status:	Approved	***Longitude:***	
Record Type:	ECA	***Latitude:***	
Link Source:	IDS	***Geometry X:***	
SWP Area Name:		***Geometry Y:***	

Approval Type: ECA-Municipal Drinking Water Systems
Project Type: Municipal Drinking Water Systems
Business Name: The Corporation of the City of Kawartha Lakes
Address: Queen St
Full Address:
Full PDF Link:
PDF Site Location:

Site: ***The Corporation of the City of Kawartha Lakes***
Bond St E Kawartha Lakes ON K9V 5R8

Database: ***ECA***

Approval No:	0685-AXYMQ8	***MOE District:***	
Approval Date:	2018-04-20	***City:***	
Status:	Approved	***Longitude:***	
Record Type:	ECA	***Latitude:***	
Link Source:	IDS	***Geometry X:***	
SWP Area Name:		***Geometry Y:***	

Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: The Corporation of the City of Kawartha Lakes
Address: Bond St E
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/2756-AWNPFU-14.pdf
PDF Site Location:

Site: ***Bell Canada***
VARIOUS BELL CANADA MANHOLES AND ACCESS CHAMBERS WITHIN THE MOE EASTERN REG. (SEE SCHEDULE "B") ON

Database: ***GEN***

Generator No: ONR000304
SIC Code: 517110, 517210, 517510
SIC Description: WIRED TELECOMMUNICATIONS CARRIERS, WIRELESS TELECOMMUNICATIONS CARRIERS (EXCEPT SATELLITE)
Approval Years: 2013
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 150
Waste Class Name: INERT INORGANIC WASTES

Waste Class: 253
Waste Class Name: EMULSIFIED OILS

Waste Class: 221
Waste Class Name: LIGHT FUELS

Site: ***The City of Kawartha Lakes Engineering***
0 Colborne St Lindsay ON K9V 3V8

Database: ***GEN***

Generator No: ON3165264
SIC Code:
SIC Description:
Approval Years: As of Dec 2018
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 211 I
Waste Class Name: Aromatic solvents and residues

Waste Class: 221 I
Waste Class Name: Light fuels

Site: ***City of Kawartha Lakes***
Colborne St. Lindsay ON

Database: ***GEN***

Generator No: ON2861699
SIC Code: 913150
SIC Description:
Approval Years: 2013
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 114
Waste Class Name: OTHER INORGANIC ACID WASTES

Waste Class: 261
Waste Class Name: PHARMACEUTICALS

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 122
Waste Class Name: ALKALINE WASTES - OTHER METALS

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 242
Waste Class Name: HALOGENATED PESTICIDES

Waste Class: 146
Waste Class Name: OTHER SPECIFIED INORGANICS

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Site: ***City of Kawartha Lakes***
Colborne St. Lindsay ON K9V 3T5

Database: ***GEN***

Generator No: ON2861699
SIC Code: 913150
SIC Description: 913150
Approval Years: 2014
PO Box No:
Country: Canada
Status:
Co Admin:
Choice of Contact: CO_OFFICIAL
Phone No Admin:
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 146
Waste Class Name: OTHER SPECIFIED INORGANICS

Waste Class: 242
Waste Class Name: HALOGENATED PESTICIDES

Waste Class: 122
Waste Class Name: ALKALINE WASTES - OTHER METALS

Waste Class: 261
Waste Class Name: PHARMACEUTICALS

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 114
Waste Class Name: OTHER INORGANIC ACID WASTES

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 263

Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Site: ***1078815 Ontario Inc.***
Lindsay Street North Lindsay ON

Database: ***PTTW***

EBR Registry No: IA00E0212
Ministry Ref No: ER-8733
Notice Type: Instrument Decision
Notice Stage:
Notice Date: May 31, 2000
Proposal Date: January 27, 2000
Year: 2000
Instrument Type: (OWRA s. 34) - Permit to Take Water
Off Instrument Name:
Posted By:
Company Name: 1078815 Ontario Inc.
Site Address:
Location Other:
Proponent Name:
Proponent Address: R.R. #5, 1800 Beardsmore Road, Peterborough Ontario, K9J 6X6
Comment Period:
URL:

Decision Posted:
Exception Posted:
Section:
Act 1:
Act 2:
Site Location Map:

Site Location Details:

Lindsay Street North Lindsay

Site: ***ONTARIO HYDRO***
LOT 21 CONCESSION 5 TRANSFORMER LINDSAY TOWNSHIP ON

Database: ***SPL***

Ref No: 68527
Site No:
Incident Dt: 3/28/1992
Year:
Incident Cause: COOLING SYSTEM LEAK
Incident Event:
Environment Impact: NOT ANTICIPATED
Nature of Impact:
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 3/29/1992
Dt Document Closed:
Municipality No: 41614
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Receiving Environment:
Incident Reason: DAMAGE BY MOVING EQUIPMENT
Incident Summary: ONTARIO HYDRO - 25 L. OF MINERAL OIL TO GROUND FROM TRANSFORMER
Site Region:
Site Municipality: LINDSAY TOWNSHIP
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:

Contaminant Qty:
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved:
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:

Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***PUC***
SCUGOG RIVER LINDSAY ST N. PUMPING STATION INVALID SITE ENTRY - PLEASE USE ANOTHER LINDSAY TOWN ON

Database: ***SPL***

Ref No:	42874	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	11/1/1990	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	WASTEWATER DISCHARGE TO WATERCOURSE	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	
Environment Impact:	POSSIBLE	***Site Lot:***	
Nature of Impact:	Water course or lake	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	11/1/1990	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:	72401		

System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: POWER INTERRUPTION
Incident Summary: PUC - 55 MIN RAW SEWAGE BYPASS TO SCUGOG RIVER. GENERAL POWER FAILURE.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***LAIDLAW TRANSPORT***
COLBORNE STREET TRANSPORT TRUCK (CARGO) LINDSAY TOWN ON

Database: ***SPL***

Ref No:	14903	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	2/10/1989	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	OTHER CONTAINER LEAK	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	M.O.E.
Environment Impact:		***Site Lot:***	
Nature of Impact:		***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	2/14/1989	***Northing:***	

Dt Document Closed: ***Easting:***
Municipality No: 72401
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Receiving Environment:
Incident Reason: ERROR
Incident Summary: LAIDLAW TRANSPORT-75 L WASTE OIL TO GROUND.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***UNKNOWN*** ***Database:*** ***SPL***
LOWER SCUGOG RIVER LINDSAY STREET NORTH PUMPING STATION. LINDSAY TOWN ON

Ref No: 84695 ***Contaminant Qty:***
Site No: ***Nature of Damage:***
Incident Dt: 4/28/1993 ***Discharger Report:***
Year: ***Material Group:***
Incident Cause: WASTEWATER DISCHARGE TO WATERCOURSE ***Health/Env Conseq:***
Incident Event: ***Agency Involved:***
Environment Impact: POSSIBLE ***Site Lot:***
Nature of Impact: Water course or lake ***Site Conc:***
MOE Response: ***Site Geo Ref Accu:***
Dt MOE Arvl on Scn: ***Site Map Datum:***
MOE Reported Dt: 4/28/1993 ***Northing:***
Dt Document Closed: ***Easting:***
Municipality No: 72401
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: UNKNOWN
Incident Summary: UNKNOWN SOURCE-25 MINUTE BYPASS OF RAW SEWAGE DUE TO FOAM IN WET WELL.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:

Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***LAIDLAW TRANSPORT***
FOR 1/4 MILE ALONG COLBORNE ST. MOTOR VEHICLE (OPERATING FLUID) LINDSAY TOWN ON

Database: ***SPL***

Ref No:	132085	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	9/19/1996	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	OTHER CONTAINER LEAK	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	WORKS
Environment Impact:	POSSIBLE	***Site Lot:***	
Nature of Impact:	Water course or lake	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	9/19/1996	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:	72401		

System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Receiving Environment:
Incident Reason: ERROR
Incident Summary: LAIDLAW TRANSPORT: 10 L DIESEL TO ROAD OVER 1/2 KM, WORKS TO CLEAN UP.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***PUC***
SCUGOG RIVER FROM THE LINDSAY ST. NORTH PUMPING STATION PUMPING STATION INVALID SITE ENTRY - PLEASE USE ANOTHER LINDSAY TOWN ON

Database: ***SPL***

Ref No:	122397	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	1/10/1996	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	WASTEWATER DISCHARGE TO WATERCOURSE	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	
Environment Impact:	POSSIBLE	***Site Lot:***	
Nature of Impact:	Water course or lake	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	1/10/1996	***Northing:***	
Dt Document Closed:		***Easting:***	

Municipality No: 72401
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: POWER INTERRUPTION
Incident Summary: PUC LINDSAY PUMP STN-RAW SEWAGE TO THE SCUGOG R. DUE TO POWER FAILURE.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***LINDSAY, TOWN OF***
SCUGOG RIVER COLBORNE STREET EAST SANITARY SEWER/PUMPING STATION LINDSAY TOWN ON

Database: ***SPL***

Ref No: 69672
Site No:
Incident Dt: 4/24/1992
Year:
Incident Cause: WASTEWATER DISCHARGE TO WATERCOURSE
Incident Event:
Environment Impact: CONFIRMED
Nature of Impact: Surface Water Pollution
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 4/24/1992
Dt Document Closed:
Municipality No: 72401
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: EQUIPMENT FAILURE
Incident Summary: LINDSAY PUC: SEWAGE OVERFLOW TO SCUGOGRIVER FROM PUMPING STN,
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:

Contaminant Qty:
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved:
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:

Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***UNKNOWN***
BOND STREET OUTFALL TO SCUGOG RIVER. LINDSAY TOWN ON

Database: ***SPL***

Ref No:	152685	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	2/22/1998	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	UNKNOWN	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	WORKS
Environment Impact:	POSSIBLE	***Site Lot:***	
Nature of Impact:	Water course or lake	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	2/22/1998	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:	72401		
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:			
Contaminant Name:			
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:	LAND / WATER		
Receiving Environment:			
Incident Reason:	UNKNOWN		
Incident Summary:	SOURCE UKN-SMALL QUANTITYGASOLINE TO STORM SEWER, SHEEN ON RIVER,BOOMED.		
Site Region:			
Site Municipality:	LINDSAY TOWN		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Source Type:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			

Site: ***UNKNOWN***
SCUGOG RIVER VIA BOND STREET OUTFALL LINDSAY TOWN ON

Database: ***SPL***

Ref No:	152911	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	3/2/1998	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	UNKNOWN	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	TOWN OF LINDSAY
Environment Impact:	CONFIRMED	***Site Lot:***	
Nature of Impact:	Water course or lake	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	3/2/1998	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:	72401		
System Facility Address:			
Client Type:			

Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: UNKNOWN
Incident Summary: UNKNOWN SOURCE: GASOLINE TO SCUGOG RIVER VIA STORM SEWER
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***LAIDLAW CARRIERS INC.***
COLBORNE ST EAST TO LINDSAY, SOUTH TO WELLINGTON, WEST TO WILLIAMS. MOTOR VEHICLE (OPERATING FLUID) LINDSAY TOWN ON

Database: ***SPL***

Ref No: 154606
Site No:
Incident Dt: 4/15/1998
Year:
Incident Cause: CONTAINER OVERFLOW
Incident Event:
Environment Impact: NOT ANTICIPATED
Nature of Impact:
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 4/15/1998
Dt Document Closed:
Municipality No: 72401
System Facility Address:
Client Type:
Contaminant Qty:
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved: FD, WORKS
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Receiving Environment:
Incident Reason: ERROR
Incident Summary: LAIDLAW BUS-DIESEL FUEL SPILL TO SEVERAL ROADS, 20-40 LITRES.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:

Site Address:

Site: ***Royel Paving Limited***
County Road 17 Kawartha Lakes ON

Database: ***SPL***

Ref No:	8264-7JDLA2	***Contaminant Qty:***	0.5 m3
Site No:		***Nature of Damage:***	
Incident Dt:		***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	Other Discharges	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	
Environment Impact:	Possible	***Site Lot:***	
Nature of Impact:	Soil Contamination; Surface Water Pollution; Vegetation Damage	***Site Conc:***	
MOE Response:	No Field Response	***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	9/11/2008	***Northing:***	
Dt Document Closed:	11/22/2008	***Easting:***	
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:	14		
Contaminant Name:	ASPHALT		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:			
Receiving Environment:			
Incident Reason:	Unknown - Reason not determined		
Incident Summary:	Asphalt in swamp area along CR 17, Kawartha Lakes		
Site Region:			
Site Municipality:	Kawartha Lakes		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Other Motor Vehicle		
SAC Action Class:	Land Spills		
Source Type:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Peterborough		
Nearest Watercourse:			
Site Name:	Swamp - West of Sturgeon Rd & East of Lindsay<UNOFFICIAL>		
Site Address:			

Site:
SCUGOG RIVER AT COLBORNE ST., LINDSAY<UNOFFICIAL> Kawartha Lakes ON

Database: ***SPL***

Ref No:	4153-5YXLXJ	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	5/13/2004	***Discharger Report:***	
Year:		***Material Group:***	Miscellaneous
Incident Cause:	Other Transport Accident	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	
Environment Impact:	Possible	***Site Lot:***	
Nature of Impact:	Surface Water Pollution	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	5/13/2004	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:			
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:			

Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: Water
Receiving Environment:
Incident Reason:
Incident Summary: Unkn owner,stolen vehicle in Scugog R,no leak
Site Region: Eastern
Site Municipality: Kawartha Lakes
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Other Motor Vehicle
SAC Action Class: Notification
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office: Peterborough
Nearest Watercourse:
Site Name: SCUGOG RIVER AT COLBORNE ST., LINDSAY<UNOFFICIAL>
Site Address:

Site: ***LINDSAY, TOWN OF***
LOWER SCUGOG RIVER LINDSAY STREET NORTH PUMPING STATION. SANITARY SEWER/PUMPING STATION
LINDSAY TOWN ON

Database: ***SPL***

Ref No: 96803
Site No:
Incident Dt: 2/24/1994
Year:
Incident Cause: WASTEWATER DISCHARGE TO WATERCOURSE
Incident Event:
Environment Impact: POSSIBLE
Nature of Impact: Water course or lake
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 2/25/1994
Dt Document Closed:
Municipality No: 72401
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: OTHER
Incident Summary: PUC - 1 HR BYPASS OF RAW SEWAGE DUE TO FOAM IN WETWELL FROM UNKNOWN SOURCE.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Contaminant Qty:
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved:
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:

Site: ***LINDSAY, TOWN OF***
MANHOLE ON ST. PAUL STREET SANITARY SEWER/PUMPING STATION KAWARTHA LAKES ON

Database: ***SPL***

Ref No:	191668	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	12/7/2000	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	VALVE/FITTING LEAK OR FAILURE	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	
Environment Impact:	POSSIBLE	***Site Lot:***	
Nature of Impact:	Soil contamination	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	12/7/2000	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:	72101		
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:			
Contaminant Name:			
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:	LAND		
Receiving Environment:			
Incident Reason:	EQUIPMENT FAILURE		
Incident Summary:	LINDSAY TOWN-450 L RAW SEWAGE TO GROUND,AIR VALVE FAILURE,CONTAINED.		
Site Region:			
Site Municipality:	KAWARTHA LAKES		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Source Type:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			

Site: ***LINDSAY, TOWN OF***
LOWER SCUGOG RIVER WELLINGTON ST. STN. LINDSAY WPCP LINDSAY TOWN ON

Database: ***SPL***

Ref No:	98684	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	4/15/1994	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	WASTEWATER DISCHARGE TO WATERCOURSE	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	
Environment Impact:	POSSIBLE	***Site Lot:***	
Nature of Impact:	Water course or lake	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	4/15/1994	***Northing:***	4912760.00
Dt Document Closed:		***Easting:***	681160.00
Municipality No:	72401		
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:			
Contaminant Name:			

Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: EQUIPMENT FAILURE
Incident Summary: LINDSAY PUC: RAW SEWAGE BYPASS TO SCUGOG RIVER DUE TO PUMP FAILURE
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Site: ***PUC***
SCUGOG RIVER FROM THE LINDSAY ST. NORTH PUMPING STATION PUMPING STATION INVALID SITE ENTRY - PLEASE USE ANOTHER LINDSAY TOWN ON

Database: ***SPL***

Ref No: 101908
Site No:
Incident Dt: 6/26/1994
Year:
Incident Cause: WASTEWATER DISCHARGE TO WATERCOURSE
Incident Event:
Environment Impact: POSSIBLE
Nature of Impact: Water course or lake
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 6/27/1994
Dt Document Closed:
Municipality No: 72401
System Facility Address:
Client Type:
Call Report Location Geodata:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: WATER
Receiving Environment:
Incident Reason: POWER INTERRUPTION
Incident Summary: PUC LINDSAY PUMP STN-RAW SEWAGE TO THE SCUGOG R. DUE TO POWER FAILURE.
Site Region:
Site Municipality: LINDSAY TOWN
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Source Type:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:

Contaminant Qty:
Nature of Damage:
Discharger Report:
Material Group:
Health/Env Conseq:
Agency Involved: MOH
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:

Site: ***LINDSAY, TOWN OF***
LOWER SCUGOG RIVER, WELLINGTON ST. STATION SANITARY SEWER/PUMPING STATION LINDSAY TOWN ON

Database: ***SPL***

Ref No:	164013	***Contaminant Qty:***	
Site No:		***Nature of Damage:***	
Incident Dt:	1/24/1999	***Discharger Report:***	
Year:		***Material Group:***	
Incident Cause:	WASTEWATER DISCHARGE TO WATERCOURSE	***Health/Env Conseq:***	
Incident Event:		***Agency Involved:***	
Environment Impact:	POSSIBLE	***Site Lot:***	
Nature of Impact:	Water course or lake	***Site Conc:***	
MOE Response:		***Site Geo Ref Accu:***	
Dt MOE Arvl on Scn:		***Site Map Datum:***	
MOE Reported Dt:	1/24/1999	***Northing:***	
Dt Document Closed:		***Easting:***	
Municipality No:	72401		
System Facility Address:			
Client Type:			
Call Report Location Geodata:			
Contaminant Code:			
Contaminant Name:			
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:	WATER		
Receiving Environment:			
Incident Reason:	EQUIPMENT FAILURE		
Incident Summary:	LINDSAY WPCP - RAW SEWAGE OVERFLOW TO THE SCUGOG R. ELECTRICAL MALFUNCTION.		
Site Region:			
Site Municipality:	LINDSAY TOWN		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Source Type:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			

Site: ***LINDSAY, TOWN OF***
LINDSAY STREET NORTH LINDSAY, TOWN OF ON

Database: ***WDS***

Approval No:	A320101	***Total Area (ha):***	0
Mob Unit Cert No:		***Landfill Cap (m³):***	0
EBR Registry No:		***Transfer Area (ha):***	0
Status:	Revoked and sent to Cooksville	***Transfer Cap (m³):***	0
Facility Type:		***Transfer Cert No:***	
Record Type:		***Inciner. Area (ha):***	0
Link Source:		***Inciner. Cap (t):***	0
Project Type:		***Process Area (m³):***	0
Application Status:		***Process Cap (m³/d):***	0
Issue Date:	11/16/1978	***Process Vol (m³):***	0
Input Date:	6/7/93	***Process Feed (m³):***	0
Date Received:		***Site Concession:***	
Est Closure Date:		***Site Region/County:***	
Mobile Capacity:	0	***SWP Area Name:***	
Mobile Units:		***MOE District:***	
Mobile Description:		***District Office:***	
Prop City:	LINDSAY, ONTARIO	***Latitude:***	
Prop Postal:		***Longitude:***	
Prop Phone:		***Geometry X:***	

Serial Link: 320101
Approval Type:
Proponent: LINDSAY, TOWN OF
Prop Address: TOWN HALL
Proponent County/District:
Full Address:
Site Lot:
Waste Class Code:
Waste Class:
Waste Type:
Waste Type Other: No
Waste Description:
Landfill Monitoring:
Landfill Ctrl Type:
Site Closing Description:
Project Description:
Municipalities Served:
Approval Description:
Other Approvals/Permits:
PDF URL:
PDF Site Location:
Geometry Y:

Site:
lot 21 con 5 ON

Database: ***WWIS***

Well ID: 1409949
Construction Date:
Use 1st: Domestic
Use 2nd:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 229941
Tag:
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: LINDSAY TOWNSHIP
Site Info:
Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src: 1
Date Received: 20-Sep-2001 00:00:00
Selected Flag: TRUE
Abandonment Rec:
Contractor: 5507
Form Version: 1
Owner:
County: BRUCE
Lot: 021
Concession: 05
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 10516401
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 25-Apr-2001 00:00:00
Remarks:
Loc Method Desc: Not Applicable i.e. no UTM
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:
Elevation:
Elevrc:
Zone: 17
East83:
North83:
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: na

Overburden and Bedrock Materials Interval

Formation ID: 932831325
Layer: 1
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 10.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932831326
Layer: 2
Color:
General Color:
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 10.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961409949
Method Construction Code: 5
Method Construction: Air Percussion
Other Method Construction:

Pipe Information

Pipe ID: 11064971
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930036048
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To:
Casing Diameter:
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930036047
Layer: 1

Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To:
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pumping Test Method Desc: PUMP
Pump Test ID: 991409949
Pump Set At:
Static Level: 8.0
Final Level After Pumping: 80.0
Recommended Pump Depth: 60.0
Pumping Rate: 10.0
Flowing Rate:
Recommended Pump Rate: 5.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934647093
Test Type: Recovery
Test Duration: 45
Test Level: 8.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934886335
Test Type: Recovery
Test Duration: 60
Test Level: 8.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934368134
Test Type: Recovery
Test Duration: 30
Test Level: 8.0
Test Level UOM: ft

Water Details

Water ID: 934008013
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 80.0
Water Found Depth UOM: ft

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Abandoned Aggregate Inventory: Provincial AAGR

The MAAP Program maintains a database of abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.*

Government Publication Date: Sept 2002*

Aggregate Inventory: Provincial AGR

The Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (ONDMNRF) maintains this database of pits and quarries. The database provides information regarding the registered owner/operator, location name, operation type, approval type, and maximum annual tonnage.

Government Publication Date: Up to Oct 2022

Abandoned Mine Information System: Provincial AMIS

The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Government Publication Date: 1800-Mar 2022

Anderson's Waste Disposal Sites: Private ANDR

The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the Ontario MOE Waste Disposal Site Inventory, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. Please note that the data is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1860s-Present

Aboveground Storage Tanks: Provincial AST

Historical listing of aboveground storage tanks made available by the Department of Natural Resources and Forestry. Includes tanks used to hold water or petroleum. This dataset has been retired as of September 25, 2014 and will no longer be updated.

Government Publication Date: May 31, 2014

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-May 31, 2022

Borehole: Provincial BORE

A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc. For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Government Publication Date: 1875-Jul 2018

Certificates of Approval: Provincial CA

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CofA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

Government Publication Date: 1985-Oct 30, 2011*

Dry Cleaning Facilities: Federal CDRY

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2021

Commercial Fuel Oil Tanks: Provincial CFOT

Locations of commercial underground fuel oil tanks. This is not a comprehensive or complete inventory of commercial fuel tanks in the province; this listing is a copy of records of registered commercial underground fuel oil tanks obtained under Access to Public Information.
Note that the following types of tanks do not require registration: waste oil tanks in apartments, office buildings, residences, etc.; aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Chemical Manufacturers and Distributors: Private CHEM

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

Government Publication Date: 1999-Jan 31, 2020

Chemical Register: Private CHM

This database includes a listing of locations of facilities within the Province or Territory that either manufacture and/or distributes chemicals.

Government Publication Date: 1999-May 31, 2022

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 2012 -Sep 2022

Inventory of Coal Gasification Plants and Coal Tar Sites: Provincial COAL

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Government Publication Date: Apr 1987 and Nov 1988*

Compliance and Convictions: Provincial CONV

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Government Publication Date: 1989-Feb 2023

Certificates of Property Use: Provincial CPU

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Government Publication Date: 1994 - Feb 28, 2023

Drill Hole Database: Provincial DRL

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNDM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Government Publication Date: 1886 - Oct 2022

Delisted Fuel Tanks: Provincial DTNK

List of fuel storage tank sites that were once found in - and have since been removed from - the list of fuel storage tanks made available by the regulatory agency under Access to Public Information.

Government Publication Date: Feb 28, 2022

Environmental Activity and Sector Registry: Provincial EASR

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Government Publication Date: Oct 2011- Feb 28, 2023

Environmental Registry: Provincial EBR

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Government Publication Date: 1994 - Feb 28, 2023

Environmental Compliance Approval: Provincial ECA

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For certificates of approval prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

Government Publication Date: Oct 2011- Feb 28, 2023

Environmental Effects Monitoring: Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Government Publication Date: 1992-2007*

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Dec 31, 2022

Environmental Issues Inventory System: Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Government Publication Date: 1992-2001*

Emergency Management Historical Event: Provincial EMHE

List of locations of historical occurrences of emergency events, including those assigned to the Ministry of Natural Resources by Order-In-Council (OIC) under the Emergency Management and Civil Protection Act, as well as events where MNR provided requested emergency response assistance. Many of these events will have involved community evacuations, significant structural loss, and/or involvement of MNR emergency response staff. These events fall into one of ten (10) type categories: Dam Failure; Drought / Low Water; Erosion; Flood; Forest Fire; Soil and Bedrock Instability; Petroleum Resource Center Event, EMO Requested Assistance, Continuity of Operations Event, Other Requested Assistance. EMHE record details are reproduced by ERIS under License with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.

Government Publication Date: Apr 30, 2022

Environmental Penalty Annual Report: Provincial EPAR

This database contains data from Ontario's annual environmental penalty report published by the Ministry of the Environment and Climate Change. These reports provide information on environmental penalties for land or water violations issued to companies in one of the nine industrial sectors covered by the Municipal Industrial Strategy for Abatement (MISA) regulations.

Government Publication Date: Jan 1, 2011 - Dec 31, 2021

List of Expired Fuels Safety Facilities: Provincial EXP

List of facilities and tanks for which there was once a fuel registration. This is not a comprehensive or complete inventory of expired tanks/tank facilities in the province; this listing is a copy of previously registered tanks and facilities obtained under Access to Public Information. Includes private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc; includes tanks which have been removed from the ground.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government. Includes fire training sites and sites at which Per- and Polyfluoroalkyl Substances (PFAS) are a concern.

Government Publication Date: Jun 2000-Dec 2022

Fisheries & Oceans Fuel Tanks: Federal FOFT

Fisheries & Oceans Canada maintains an inventory of aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Government Publication Date: 1964-Sep 2019

Federal Identification Registry for Storage Tank Systems (FIRSTS): Federal FRST

A list of federally regulated Storage tanks from the Federal Identification Registry for Storage Tank Systems (FIRSTS). FIRSTS is Environment and Climate Change Canada's database of storage tank systems subject to the Storage Tank for Petroleum Products and Allied Petroleum Products Regulations. The main objective of the Regulations is to prevent soil and groundwater contamination from storage tank systems located on federal and aboriginal lands. Storage tank systems that do not have a valid identification number displayed in a readily visible location on or near the storage tank system may be refused product delivery.

Government Publication Date: May 31, 2018

Fuel Storage Tank: Provincial FST

List of registered private and retail fuel storage tanks. This is not a comprehensive or complete inventory of private and retail fuel storage tanks in the province; this listing is a copy of registered private and retail fuel storage tanks, obtained under Access to Public Information.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Fuel Storage Tank - Historic: Provincial FSTH

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks. Public records of private fuel storage tanks are only available since the registration became effective in September 1989. This information is now collected by the Technical Standards and Safety Authority.

Government Publication Date: Pre-Jan 2010*

Ontario Regulation 347 Waste Generators Summary: Provincial GEN

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use..." followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

Government Publication Date: 1986-Oct 31, 2022

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2019

TSSA Historic Incidents: Provincial HINC

List of historic incidences of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen recorded by the TSSA in their previous incident tracking system. The TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, the TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Records are not verified for accuracy or completeness. This is not a comprehensive or complete inventory of historical fuel spills and leaks in the province. This listing is a copy of the data captured at one moment in time and is hence limited by the record date provided here.

Government Publication Date: 2006-June 2009*

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

Fuel Oil Spills and Leaks: Provincial INC

Listing of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen reported to the Spills Action Centre (SAC). This is not a comprehensive or complete inventory of fuel-related leaks, spills, and incidents in the province; this listing in a copy of incidents reported to the SAC, obtained under Access to Public Information. Includes incidents from fuel-related hazards such as spills, fires, and explosions. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Landfill Inventory Management Ontario: Provincial LIMO

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the Ministry of the Environment, Conservation and Parks compiles new and updated information. Includes small and large landfills currently operating as well as those which are closed and historic. Operators of larger landfills provide landfill information for the previous operating year to the ministry for LIMO including: estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills include information such as site owner, site location and certificate of approval # and status.

Government Publication Date: Mar 21, 2022

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Mineral Occurrences: Provincial MNR

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the plan metric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

Government Publication Date: 1846-Feb 2023

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

Non-Compliance Reports: Provincial NCPL

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

Government Publication Date: Dec 31, 2021

National Defense & Canadian Forces Fuel Tanks: Federal NDFT

The Department of National Defense and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

Government Publication Date: Up to May 2001*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Apr 2018

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the Canada Energy Regulator (CER) - previously the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Jun 30, 2021

National Energy Board Wells: Federal NEBP

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.

Government Publication Date: 1993-May 2017

Oil and Gas Wells: Private OGWE

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-Nov 30, 2022

Ontario Oil and Gas Wells: Provincial OOGW

In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, and well cap date, license No., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Government Publication Date: 1800-Aug 2021

Inventory of PCB Storage Sites: Provincial OPCB

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Government Publication Date: 1987-Oct 2004; 2012-Dec 2013

Orders: Provincial ORD

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Government Publication Date: 1994 - Feb 28, 2023

Canadian Pulp and Paper: Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Government Publication Date: 1999, 2002, 2004, 2005, 2009-2014

Parks Canada Fuel Storage Tanks: Federal PCFT

Canadian Heritage maintains an inventory of known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Government Publication Date: 1920-Jan 2005*

Pesticide Register: Provincial PES

The Ontario Ministry of the Environment and Climate Change maintains a database of licensed operators and vendors of registered pesticides.

Government Publication Date: Oct 2011- Feb 28, 2023

Pipeline Incidents: Provincial PINC

List of pipeline incidents (strikes, leaks, spills). This is not a comprehensive or complete inventory of pipeline incidents in the province; this listing in an historical copy of records previously obtained under Access to Public Information. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2021

Private and Retail Fuel Storage Tanks: Provincial PRT

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Government Publication Date: 1989-1996*

Permit to Take Water: Provincial PTTW

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Government Publication Date: 1994 - Feb 28, 2023

Ontario Regulation 347 Waste Receivers Summary: Provincial REC

Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Government Publication Date: 1986-1990, 1992-2020

Record of Site Condition: Provincial RSC

The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up.
RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09).

Government Publication Date: 1997-Sept 2001, Oct 2004-Feb 2023

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-May 31, 2022

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Ontario Spills: Provincial SPL

List of spills and incidents made available the Ministry of the Environment, Conservation and Parks. This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X. The Ministry of the Environment, Conservation and Parks cites the coronavirus pandemic as an explanation for delays in releasing data pursuant to requests.

Government Publication Date: 1988-Mar 2021; May 2021-Oct 2021

Wastewater Discharger Registration Database: Provincial SRDS

Facilities that report either municipal treated wastewater effluent or industrial wastewater discharges under the Effluent Monitoring and Effluent Limits (EMEL) and Municipal/Industrial Strategy for Abatement Regulations. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment keeps record of direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation, Mining, Petroleum Refining, Organic Chemicals, Inorganic Chemicals, Pulp & Paper, Metal Casting, Iron & Steel, and Quarries.

Government Publication Date: 1990-Dec 31, 2020

Anderson's Storage Tanks: Private TANK

The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1915-1953*

Transport Canada Fuel Storage Tanks: Federal TCFT

List of fuel storage tanks currently or previously owned or operated by Transport Canada. This inventory also includes tanks on The Pickering Lands, which refers to 7,530 hectares (18,600 acres) of land in Pickering, Markham, and Uxbridge owned by the Government of Canada since 1972; properties on this land has been leased by the government since 1975, and falls under the Site Management Policy of Transport Canada, but is administered by Public Works and Government Services Canada. This inventory provides information on the site name, location, tank age, capacity and fuel type.

Government Publication Date: 1970 - Apr 2020

Variances for Abandonment of Underground Storage Tanks: Provincial VAR

Listing of variances granted for storage tank abandonment. This is not a comprehensive or complete inventory of tank abandonment variances in the province; this listing is a copy of tank abandonment variance records previously obtained under Access to Public Information. In Ontario, registered underground storage tanks must be removed within two years of disuse; if removal of a tank is not feasible, an application may be sought for a variance from this code requirement.
Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Waste Disposal Sites - MOE CA Inventory: Provincial WDS

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Government Publication Date: Oct 2011- Feb 28, 2023

Waste Disposal Sites - MOE 1991 Historical Approval Inventory: Provincial WDSH

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Government Publication Date: Up to Oct 1990*

Water Well Information System: Provincial WWIS

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Government Publication Date: Jun 30 2022

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

C

Appendix C
Site and Aerial Photographs

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
1	23/04/13	North

Description
Real Estate Broker Office located at 130 William Street North.

Site Description
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
2	23/04/13	East

Description
Two monitoring wells located in the parking lot of retirement home at 140 William Street North.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
3	23/04/13	East

Description
Transformer located on North side of 140 William Street North.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
4	23/04/13	East

Description
Scugog River East bank (upstream of porject boundary) with culvert.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
5	23/04/13	West

Description
Drain on West bank of Scugog River (upstream of project boundary).

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
5	23/04/13	West

Description
Rear courtyard of retirement home located at 140 William Street North.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

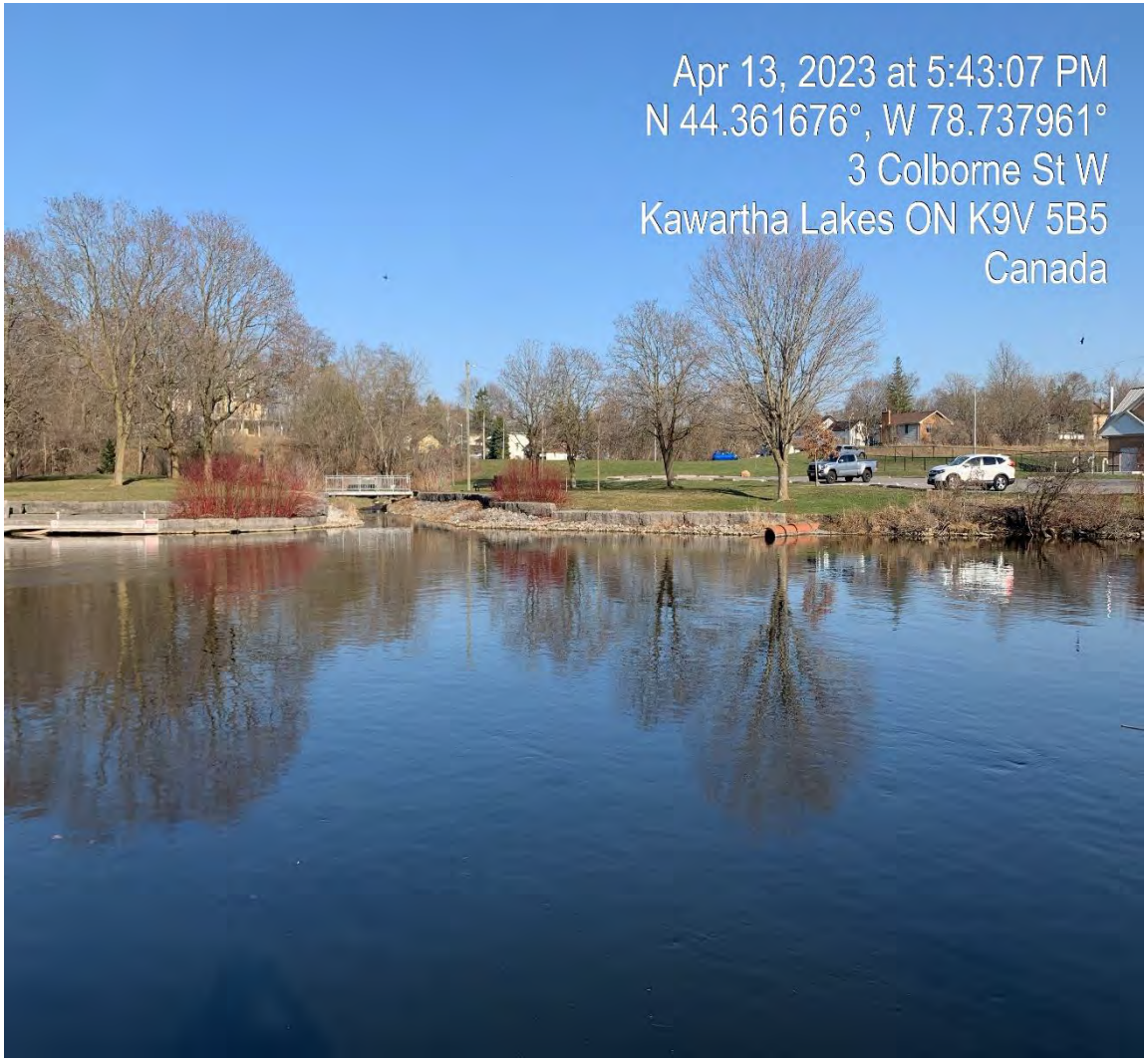
Photo #	Date	Cardinal Direction
6	23/04/13	East

Description
Location of Gemtec borehole BH23-F2 on West side of Scugog River.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
7	23/04/13	East

Description
Tributary connecting to the Scugog River with walking bridge on East bank located in project area.



Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
8	23/04/13	South

Description
Rear of appartment buildings located at 2 Colborne Street along the Scugog River.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
9	23/04/13	South

Description
Intersection of William Street North and Colborne Street (Retirement home parking lot in background).

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
10	23/04/13	East

Description
Driveway of 4 Colborne Street with some propane cylinders in the background.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
11	23/04/13	Southwest

Description
Intersection of William Street and Colborne Street.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
12	23/04/13	South

Description
Pumphouse and transformer with locked gate located on the East side of the Scugog River, on Lindsay Street North, South of Rivera Park.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
13	23/04/13	West

Description
Metal culvert on East bank of the Scugog River in project area.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
14	23/04/13	West

Description
Gemtec borehole and transformer located the East side of the Scugog River, on the North side of Lindsay Street North.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
15	23/04/13	Northwest

Description
Tributary on East side of Scugog River at Lindsay Street North crossing.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
16	23/04/13	South

Description
Culvert draining into tributary.

Site Location
Scugog River crossing located within the Colborne Street right-of-way in Lindsay, Ontario. The Site encompasses a number of properties and has an approximate area of 7.09 ha. The Site is bound by William Street to the west, 130 William Street, 140 William Street, and the Scugog River to the South, and Lindsay Street to the East.

Photo #	Date	Cardinal Direction
17	23/04/13	East

Description
Lindsay Street North looking towards St. Paul Street.

Aerial Photograph – Ecolog ERIS (via NAPL)
Colborne Street Bridge
Kawartha Lakes, Ontario
1959

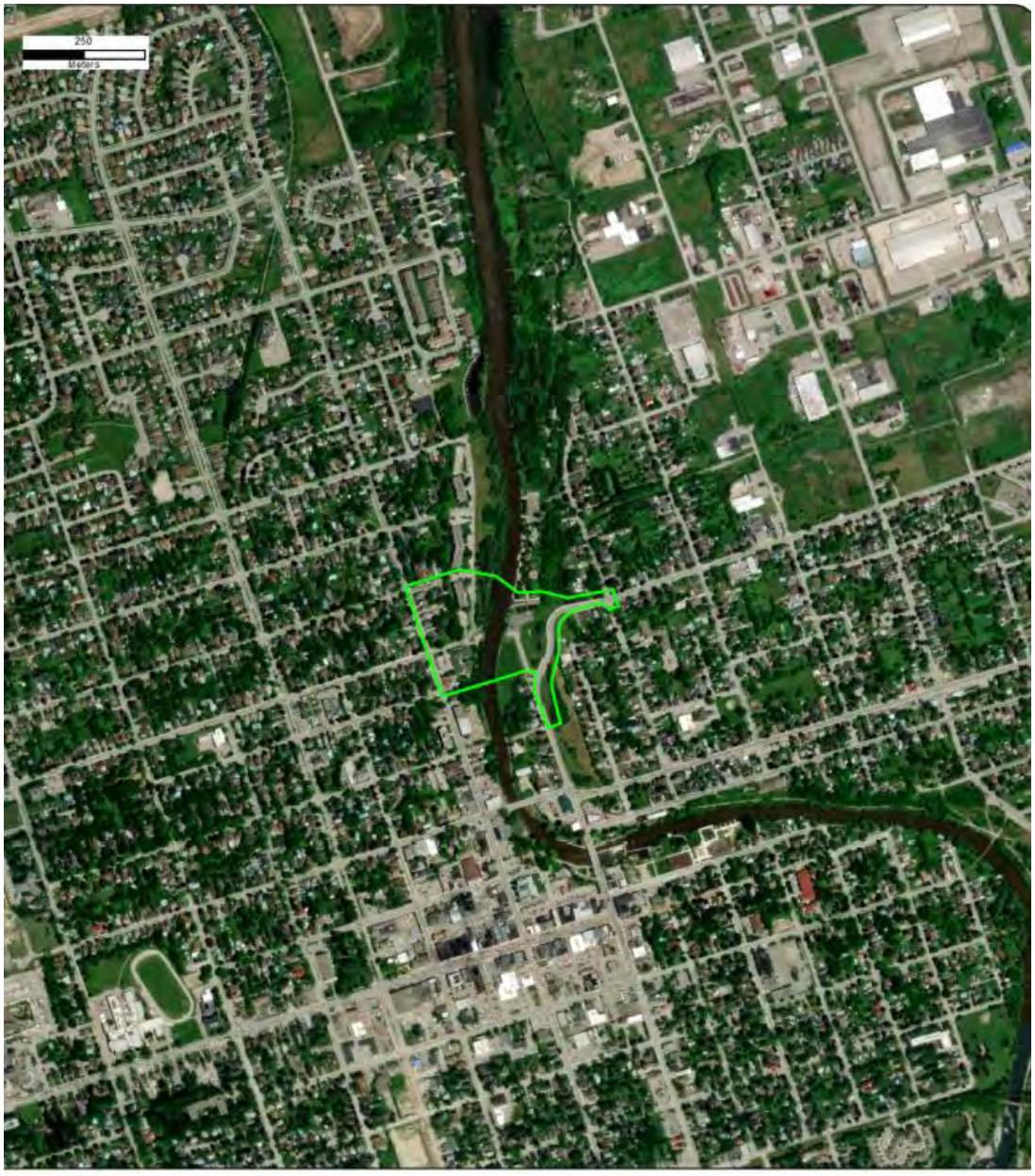
Aerial Photograph – Ecolog ERIS (via NAPL)
Colborne Street Bridge
Kawartha Lakes, Ontario
1964

Aerial Photograph – Ecolog ERIS (via NAPL)
Colborne Street Bridge
Kawartha Lakes, Ontario
1976

Aerial Photograph – Ecolog ERIS (via NAPL)
Colborne Street Bridge
Kawartha Lakes, Ontario
1981

Aerial Photograph - Google Earth Pro
Colborne Street Bridge
Kawartha Lakes
October 2007

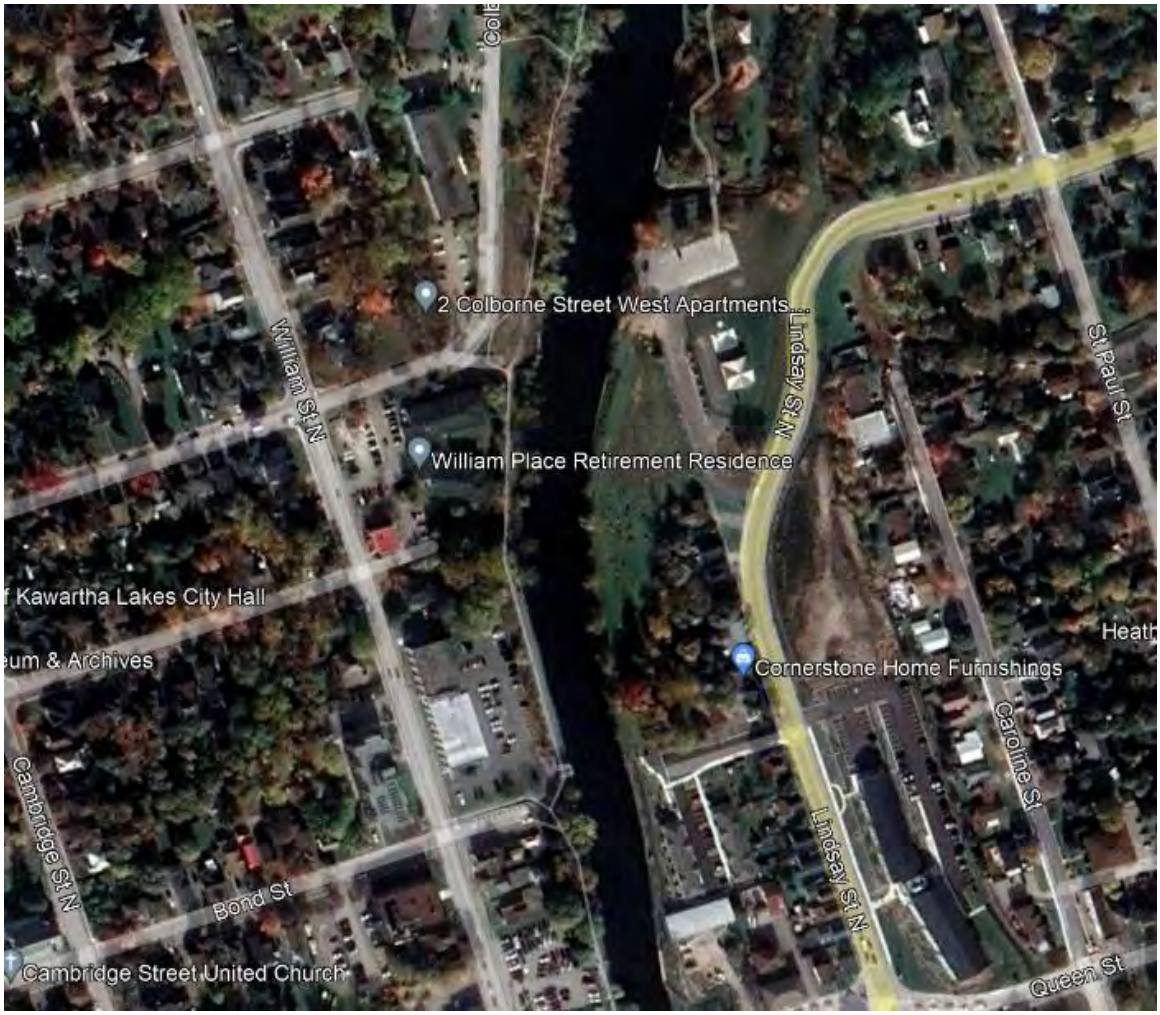
B001592



Aerial Photograph – Ecolog ERIS (via NAPL)
Colborne Street Bridge
Kawartha Lakes
2012

Aerial Photograph - Google Earth Pro
Colborne Street Bridge
Kawartha Lakes
May 2018

B001592



Aerial Photograph - Google Earth Pro
Colborne Street Bridge
Kawartha Lakes
October 2019

B001592

D

Appendix D
Topographic Map

Ontario

MINISTRY OF NATURAL RESOURCES AND FORESTRY

Make a Topographic Map

Colborne Street Bridge
Phase One Environmental Site Assessment

Notes:

Project No. C14-0391

Legend

- Building as Symbol
- Building to Scale
- Airport
- Heliport \ Hospital Heliport
- Seaplane Base
- Ferry Route
- Trail Head \ Trail
- Railway \ Train Station
- Railway with Bridge
- Railway with Tunnel
- Road (Major → Minor)
- Winter Road
- Road with Bridge
- Road with Tunnel
- Primary, Kings or 400 Series Highway
- Secondary Highway
- Tertiary Highway
- District, County, Regional or Municipal Road
- Toll Highway
- One Way Road
- Road with Permanent Blocked Passage
- Road with Address Ranges
- Hydro Line, Communication Line or Unknown Transmission Line
- Natural Gas Pipeline, Water Pipeline or Unknown Pipeline
- Spot Height
- Index Contour
- Contour
- Wooded Area
- Wetland
- Waterbody
- Waterbody Elevation
- Watercourse
- Falls
- Rapids
- Rapids \ Falls
- Rapids
- Rocks
- Lock Gate
- Dam \ Hydro Wall
- Dam \ Hydro Wall
- Provincial \ State Boundary
- International Boundary
- Upper Tier \ District Municipal Boundary
- Lower Tier \ Single Tier Municipal Boundary
- Lot Line
- Indian Reserve
- Provincial Park
- National Park
- Conservation Reserve
- Military Lands

0 0.5 km

Projection: Web Mercator

The Ontario Ministry of Natural Resources and Forestry shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. This map should not be used for: navigation, a plan of survey, routes, nor locations.

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E

Appendix E
Assessor Qualifications

KAREN D GREER, M.Sc., P.Geo.

LEAD HYDROGEOLOGIST - ENVIRONMENT




Environmental Monitoring | Environmental Site Assessment | Site Remediation | Excess Soil Management

CAREER

CIMA+ (since January 2020)

BluMetric Environmental Inc. (2003 - 2020)

Environment Canada, Environmental Research Assistant (2002)

Aqua Terre Solutions Inc., Field Technician (2001)

University of Waterloo, Hydrogeology Field Assistant (2000)

EDUCATION

M.Sc., Earth Science - Hydrogeology, University of Waterloo, 2009

B.Sc., Earth Science / Environmental Hydrogeology Specialization, University of Waterloo, 2003

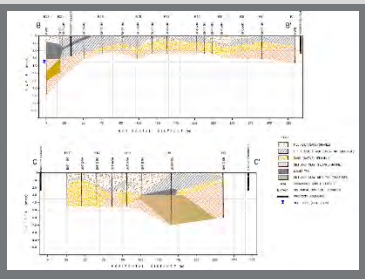
ASSOCIATIONS

Association of Professional Geoscientists of Ontario

Ordre des géologues du Québec

National Ground Water Association

International Association of Hydrogeologists



Hydrogeological Characterisation

Dewatering

● Quality ● Respect ● Professionalism

PROFILE

Ms. Karen Greer is a Lead Professional/Senior Hydrogeologist/Project Manager with over 20 years of technical and project management experience working extensively on projects detailing the hydrogeological properties and fate and transport of contaminants within the subsurface. Client sectors include federal, provincial, and municipal governments, large industry, commercial, and private enterprises.

She routinely manages and acts in a senior technical lead on projects relating to Environmental Site Assessments (ESA), contaminated site remediation, hydrogeological investigations as well as permitting and approvals. Her background, experience and understanding of physical and chemical hydrogeology allows her to take on the role as a senior technical professional. Ms. Greer is Professional Geoscientist with the Professional Geoscientists of Ontario (P.Geo.), the Ordre des géologues du Quebec (géo.), a Qualified Person (QP) as per Ontario Regulation 153/04 (QP_{ESA}) as well as a QP groundwater in Ontario.

DEVELOPMENT AND/OR ADVANCED TRAINING

- Expert Witness Forum 2018
- Fundamentals of Aquifer Test Interpretation, S.S. Papadopulos & Associates Inc.
- Advanced Construction Dewatering, Aquatech
- First Aid/CPR

PROJECT EXPERIENCE

University of Ottawa Property Re-development Geotechnical and Environmental Services to Support Site Plan Control Application, Ottawa ON (2020- on-going)

Environmental services support of the redevelopment of 200 Lees Avenue in Ottawa Ontario. The work was completed to support Site Plan Control application with the City of Ottawa. The scope of work included, Environmental Impact Study with Tree Conservation, Phase One and Two ESA, Risk Assessment, Remedial Options Assessment, Remedial Action Plan, Geotechnical Investigation, and Excess Soil Management planning. The work was completed in consultation with major stakeholders and regulators to facilitate the design and construction tendering.

Project Manager, Lead Hydrogeologist, QP_{ESA}

The Nation Municipality, New Water Transition Main Expansion Environmental Support Services, Limoge ON (2020-2022)

Under standing offer agreement, CIMA+ was retained to completed environmental studies (EIS, Tree Conservation, Phase I ESA, Excess Soil Management) to support the construction of a new water transition main between the Limoge WTP and the Cheney water tower within the Municipality. The studies completed worked to inform the detailed design while identifying and addressing environmental constrains around habitats, species at risk, tree

conservation and the potential for contaminated soils. Steps were taken to make recommendations for excess soil management as well as environmental protection.

Senior Hydrogeologist, QP_{ESA}

Rehabilitation and Adaptive Re-Use Upgrades to Municipal Operation Center, Thorold ON (2020-ongoing)

Project management, design engineering and environmental assessment services required for the rehabilitation of the Municipal Operations Center. The scope of environmental services included the preparation of Environmental Site Assessments, Excess Soil Management Strategies and an Environmental Impact Statement addressing potential impacts to terrestrial and aquatic species, species at risk and the Lake Gibson Provincially Significant Wetland. CIMA+ has also provided specialist environmental support to address regional and provincial policy requirements.

Senior Hydrogeologist, QP_{ESA}

Domaine Chanteclerc Estates, Casselman ON (2020-ongoing)

Completed a Phase 1 Environmental Site Assessment, an Environmental Impact Study, and Environmental Planning Services to support the proposed development of Part of Lots 10 and 11, Concession 6, in Casselman, Ontario. Agency / Stakeholder Consultation was also completed to discuss the various environmental constraints on the Site (i.e. area of natural and scientific interest, wetlands, conservation authority regulated area, butternut health assessment, confirmed archaeological site).

Senior Hydrogeologist, QP_{ESA}

Ontario Power Generation, Environmental support of Engineering Design and Construction of a new development, Darlington Energy Complex (DEC), Clarington, ON (2020-ongoing)

In support of development for the DEC, environmental support was provided as part of the engineer design and constriction of a new building and parking lot. The environmental work involved the completion on Environmental Site Assessments, geotechnical investigation, Excess Soil Management strategy development, hydrogeological site characterization for construction dewatering and Environmental Impact Studies.

Senior Hydrogeologist, QP_{ESA}

North Toronto Wastewater Treatment Plant – Process and ECAP2 Upgrades, City of Toronto Excess Soil Management (2020-ongoing)

Engineering support for the upgrades of the North Toronto Wastewater Treatment Plan is on-going including the management of excess soils during construction. The excess soil management works include acting as the project leaders QP, specification development, contract review and contractor oversight. Work is inclusive of reviewing contract report submissions for compliance of the regulation and facilitating communications with the Project Leader.

Lead Hydrogeologist

Germain Hotels, Phase One and Two ESA for the Airport Hotel, Ottawa International Airport (2020).

Reviewed Phase One and Two ESAs as well as the remedial options and recommendations to be implemented during construction for work completed in support of the development of a commercial hotel development at the Ottawa International Airport. Based on the findings of fill of un-known quality and potential impacts associated with historical airport operations. The work was completed in accordance with O.Reg 153/04 as amended in support of a Site Plan Control Application with the City of Ottawa. *Peer*

Perley and Rideau Veterans' Health Centre, Phase One ESA, Perley and Rideau Vartan's Health Center, Ottawa (2020)

Provided technical support for recommendations of Phase One ESA for construction completed in support of site re-development. The Phase One ESA was completed in accordance with O.Reg 153/04, as amended in support of a Site Plan Control Application with the City of Ottawa. *Technical support.*

Private Client. Phase One ESA for Re-development of Residential Properties, Pretoria Ave. Ottawa ON (2019)

Completed a Phase One ESA in support of the re-development of two residential properties in down-town Ottawa. The report was completed in support of a Site Plan Control Application with the City of Ottawa. Facilitated the submission of the application in coordination with the site architect and planner and worked to address City comments resulting in a successful application. *Project Manager and Senior Hydrogeologist and QP_{ESA}*

Private Client. Phase One ESA and Limited Phase Two ESA for Re-development of Residential Property, Montreal Road, Ottawa ON (2017)

Phase One ESA was completed in support of the re-development of a residential property. Based on the findings of fill of un-known quality from the Phase One, a limited Phase Two was completed concluding that soil quality on the site met the applicable residential soil standards. The work was completed in support of a Site Plan Control Application with the City of Ottawa. *Project Manager and Senior Hydrogeologist and QP_{ESA}*

Waste Management of Canada Inc. Excess Soil Management for West Carleton Environmental Centre, Ottawa ON (2019 - 2020)

Environmental Certificate of Approval was amended to facilitate a Soil Receiving Site. Excess Soil Management Plan was established along with Soil Management Plan, Fill Management Plan, Best Management Practices all based on a Risk Assessment completed for the suitability of the site. Soil pad was designed and built to facilitate soil received at the site for the purpose of on-site management and re-use. Acted as qualified person for the receiving site.

Project Manager and QP

Public Works and Government Services Canada. Phase I/II/III ESA, Groundwater Investigations, CSM Update, Domestic Water Sampling, and Remedial Options Analysis. Former Fire Fighter Training Area at the Sault Ste. Marie Airport and Adjacent Pointe Des Chenes Campground, Sault Ste. Marie ON. (2015 - 2018)

Hydrogeological and site assessment investigations of the site and downgradient property with soil and groundwater impacted by PHC, BTEX, and PFAS. The project required; quick and effective response to changing client needs and project objectives; liaising with stakeholders (Ministry of the Environment in Ontario, Health Canada, downgradient property owner, City of Sault Ste. Marie, and general public); technical data interpretation and reporting oversight; preliminary remedial and risk management options assessments.

Project Manager and Senior Hydrogeologist

Public Works and Government Services Canada. Gap Analysis, Phase II/III ESA, Human Health and Ecological DQRA, Remedial Options Analysis, and Risk Management Plan Development/Implementation. Former RV Compound at CFB North Bay, North Bay ON. (July 2015 - March 2017)

The project saw the design and implementation of an environmental monitoring and maintenance plan, multi-year database and site- specific health and safety plan to manage human and ecological risks at a former small landfill site with soil, sediment, and groundwater impacted with PAH, PHC/BTEX, and inorganics. Project responsibilities for stakeholder communication; completing technical data interpretation and reporting oversight; and QA/QC of project deliverables.

Project Manager and Senior Hydrogeologist

Private Client, Phase One / Two ESA and Remediation at a PAH Impacted Site. Cornwall ON. (2013 - 2016)

Phase One and Two, including remediation was completed in support of a RSC for the site which had been impacted by historic operations of an adjacent property where the contaminants of concern were identified as PHA. The project roll involved liaising with stakeholders (Ministry of the Environment, downgradient property owner, and general public); technical data interpretation and reporting oversight; excess soil management (QP); and detailed QA/QC of project deliverables. RSC was successfully filed.

Project Manager, Senior Hydrogeologist and QP_{ESA}

Private Client, Phase One and Two ESA, and Remediation at a PAH Impacted Site. Cornwall ON. (2011 - 2013)

Extensive remediation works to address historical PHA, PHC and metals impacts was completed for the site which had been contaminated by historic on- site industrial activities. A Phase One and Two ESA, including remediation was completed in support of filing an RSC. The project roll included liaising with stakeholders; completing detailed technical data interpretation and reporting oversight; excess soil management (QP); and oversaw and was responsible for QA/QC of project deliverables. RSC was successfully filed.

Project Manager, Senior Hydrogeologist and QP_{ESA}

Infrastructure Ontario. Phase I/II ESA, Huron Park ON. Project Hydrogeologist. (2005)

Assessment of a large former air force bases with multiple tenants undertaking various light industrial and commercial activities. The project included the collection of soil, ground water and indoor air samples in order to determine chemicals of concern. Reporting was completed to satisfy the client requirements for divestiture.

Project Hydrogeologist

Private Client, Remedial Action Plan Development and Implementation for Site Remediation, Cornwall ON, (2017-2019)

Remedial Action Plan development and implementation for a private client at a site located adjacent to the St. Lawrence Canal. The RAP detailed the remedial actions to be taken to clean up the site to background conditions. It included steps that needed to be take and mitigation measures around species at risk, proximity to water works, structural and geotechnical engineering requirements, excess soil management, infrastructure constraints (overhead power lines and buried gas lines), permitting and approvals, and regulatory requirements (provincial and federal). Project included an extensive soil remediation adjacent to the canal in the vicinity of structures (dam, bridge, pier, etc.) as well as existing infrastructure (hydro poles, high pressure gas line etc.). Stakeholder, sub-consultant and contractor management and communication were key to the successful completion of the Project.

Project Manager, Senior Hydrogeologist and QP_{ESA}

City of Kawartha Lakes

Colborne Street Bridge Detailed Design Traffic Brief

Wednesday, December 11, 2024

CIMA+

500-5935 Airport Road
Mississauga, ON L4V 1W5
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Contact

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City of Kawartha Lakes

Colborne Street Bridge Detailed Design

Traffic Brief

Project Number: B001592

Prepared by:

Janice Zhang, EIT

Verified by:

Ronauq Sabharwal, P.Eng., M.EngCEM

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1. Introduction

CIMA Canada Inc. (CIMA+) was retained by the City of Kawartha Lakes (the City) to complete a Detailed Design for the Colborne Street Bridge. A Municipal Class Environmental Assessment (MCEA) Study was completed in 1994 (by TSH) and subsequent EA Amendment in 2000 (by Cole Sherman Associates) which identified Colborne Street to be the preferred Scugog River bridge crossing to address the need for additional capacity.

The objective of this Traffic Brief Report is to evaluate the expected future traffic operations of the study intersections and determine required configurations for accommodating future traffic demand.

The existing geometry of study area intersections and proposed Colborne Street bridge connection are shown in **Figure 1**.

Figure 1: Study Area

The traffic analysis includes the following intersections:

- Colborne Street and Victoria Street;
- Colborne Street and William Street; and,
- Colborne Street and Lindsay Street (future intersection).

It should be noted that Colborne Street and Victoria Street is a signalized intersection under exiting conditions and is included for coordination purpose.

2. Study Methodology

2.1 Traffic Data and Assumptions

A new bridge crossing may significantly alter route selections and traffic patterns in the network. Due to lack of input from a city-wide travel demand modal, assumptions are made using available data and resources to estimate future volumes at study intersections.

Most recent 8-hour Turning Movement Counts (TMC) were provided by the City for the following locations:

- Colborne Street and Victoria Avenue (August 1, 2024)
- Colborne Street and William Street (July 11, 2023)

These TMCs reflect the existing traffic demand and patterns. Although having a new bridge crossing at Colborne Street will impact future traffic demand at study intersections, the existing TMCs provide insight into high level traffic patterns and variations by time of day. Both locations reflect progressively increasing traffic demand throughout the day, with highest hourly volumes in all directions during PM peak hour. The raw TMCs provided can be found in **Appendix A.**

In 2020, A Class Environmental Assessment and Corridor Study (Corridor Study) was conducted by HDR to assess the existing and future corridor needs along Colborne Street. The traffic analysis of this study was conducted based on observed TMCs collected in 2013, which were included in the report. As part of the Corridor Study, traffic diversion impacts with the presence of a new crossing at Colborne Street were evaluated for 2031 PM peak period. The full report can be found in **Appendix B**.

The future traffic operations at study intersections are evaluated for the weekday AM peak period, Off-peak period, and PM peak period, under 2031 and 2051 future horizon years. Future traffic volumes with the presence of Colborne Bridge are developed based on the trip diversion assumptions and projected 2031 PM period traffic volumes from the Corridor Study. These volumes are adjusted to reflect more balanced demand along the existing Wellington bridge crossing versus the new Colborne bridge crossing. AM peak and Off-peak period hourly volumes are estimated based on their ratio to PM peak hour volume, which are determined from the most recent TMCs.

The 2051 horizon year traffic volumes are estimated by applying an annual growth rate to the developed 2031 volumes. Comparison between the 2013 observed TMCs from the Corridor Study and the most recent TMCs provided by the City indicates a slightly negative growth. Therefore, a modest 2% compound annual growth rate is applied to 2031 volumes to estimate 2051 volumes in order to be conservative.

2.2 Traffic Operational Analysis

The intersection operations are assessed using the Synchro/SimTraffic 11 software, which utilizes the Highway Capacity Manual (HCM) 2000 methodology published by the Transportation Research Board National Research Council.

Synchro 11 can analyze both signalized and unsignalized intersections in a road corridor or network considering the spacing, interaction, queues, and operations between intersections. Intersection operations performance metrics are reported in terms of Level of Service (LOS), volume to capacity (V/C) ratios.

Level of Service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay.

SimTraffic is used to calculate the 95th percentile queue length and to visually verify operational performance.

Table 1 summarizes the LOS criteria for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Criteria

Level of Service	Average Control Delay per Vehicle (second/vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤10	≤10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

3. Future Traffic Conditions

With the new bridge crossing introduced at Colborne Street, traffic demand in the east-west direction along Colborne Street is expected to increase as traffic gets diverted from the existing Wellington Bridge crossing to the new Colborne Bridge. To accommodate the future traffic while considering potential property impacts, the proposed lane configurations of study area intersections are illustrated in **Figure 2**. According to Addendum #3 of the project RFP, Colborne Street and William Street intersection and Colborne Street and Lindsay Street intersection are assumed to be signalized under both 2031 and 2051 future conditions. Proposed storage lane lengths are determined based on the 95th percentile or average queues from ultimate (2051) horizon year, as discussed in the following sections.

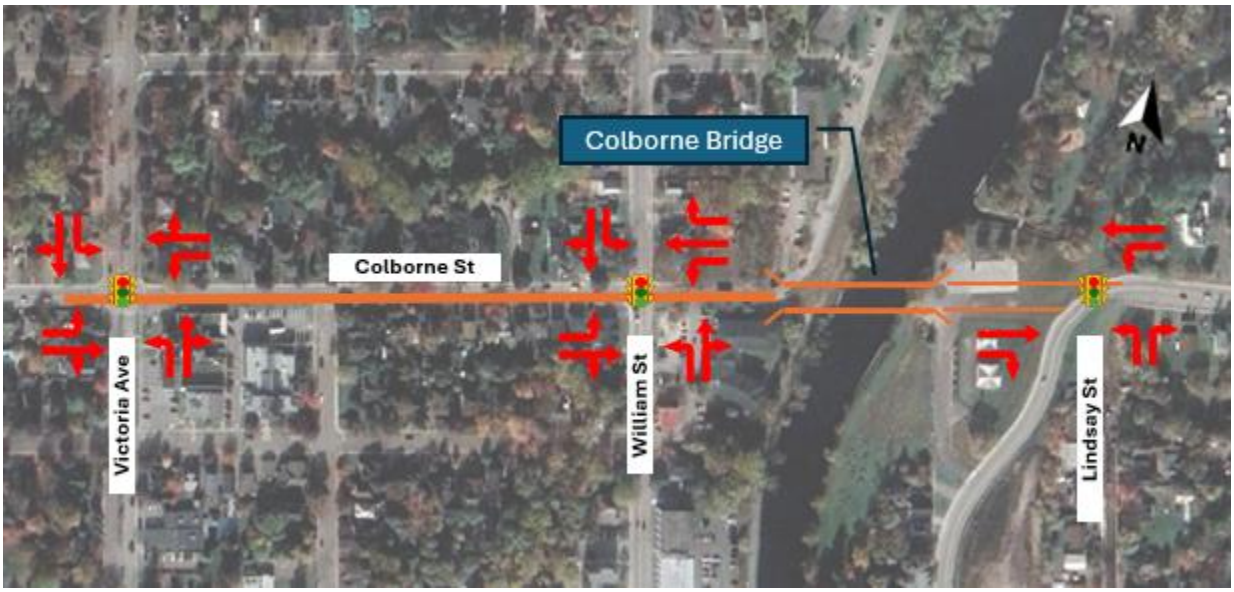

Figure 2: Future Configurations

3.1 2031 Future Conditions

Traffic operations for 2031 future conditions are analyzed for the weekday AM peak, Off-peak, and PM peak hours. Based on assumptions described in Section 2.1, the projected volumes are illustrated in **Figure 3**.

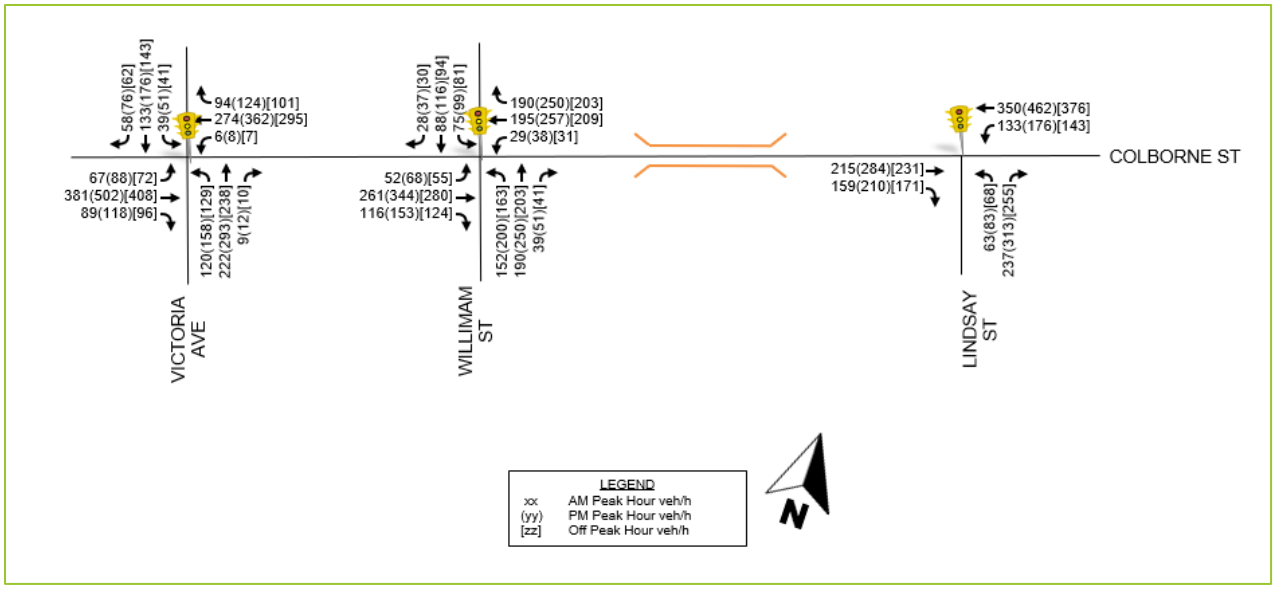

Figure 3: 2031 Projected Future Volumes

The optimized signal timings are developed based on existing signal timings at Colborne Street and Victoria Avenue intersection (**Appendix A**) and OTM Book 12[1] requirements. The optimized signal timings are summarized in **Table 2.**

Table 2: 2031 Optimized Signal Timings

Phase	Amber	All-Red	Walk	FDW	AM Split	PM Split	Off Split
Colborne Street and Victoria Avenue							
2: EB	4.0	2.0	20	10	54	50	55
3: SBL	3.0	1.0	-	-	-	9	-
4: NB	4.0	2.0	15	10	36	31	25
5: EBL	3.0	1.0	-	-	-	9	-
6: WB	4.0	2.0	20	10	54	41	55
7: NBL	3.0	1.0	-	-	-	9	-
8: SB	4.0	2.0	15	10	36	31	35
				Cycle Length:	90	90	90
Colborne Street and William Street							
1: WBL	3.0	1.0	-	-	-	9	-
2: EB	3.0	2.6	7	12	52	41	53
3: SBL & WBR OV	3.0	1.0	-	-	-	10	-
4: NB	3.0	2.8	7	13	38	30	37
6: WB	3.0	2.6	7	12	52	50	53

[1] Ontario Traffic Manual Book 12: Traffic Signals. (2012). Ministry of Transportation Ontario

Phase	Amber	All-Red	Walk	FDW	AM Split	PM Split	Off Split
7: NBL	3.0	1.0	-	-	-	10	-
8: SB	3.0	2.8	7	13	38	30	37
				Cycle Length:	90	90	90
Colborne Street and Victoria Avenue							
1: WBL	3.0	1.0	-	-	-	15	-
2: EB	3.0	3.5	7	12	53	40	53
4: NB	3.0	3.9	7	10	37	35	37
6: WB	3.0	3.5	7	12	53	55	53
				Cycle Length:	90	90	90

Table 3 provides a summary of the operational analysis results for 2031 conditions and the proposed storage lengths. The full Synchro HCM 2000 and SimTraffic reports can be found in **Appendix C**. Under 2031 future conditions, the 95th percentile queue of eastbound left-turn movement at Colborne Street and Victoria Avenue is expected to exceed its existing available storage in all periods. However, based on its LOS, V/C ratio, and average queue length, the movement is not expected to experience capacity constraints. No operational issues are expected for the rest of the movements and intersections.

Table 3: 2031 Traffic Operations Summary

Approach			Volume (vph)	Delay (sec)	LOS	v/c	95th %tile Queue (m)	Average Queue (m)	Proposed Storage (m)
Colborne Street and Victoria Avenue (Signalized)									
EB	L	EBL	67 (88) [72]	7 (14) [7]	A (B) [A]	0.12 (0.3) [0.14]	29 (30) [30]	12 (16) [17]	20[2]
	T/R	EBT	381 (502) [408]	9 (21) [10]	A (C) [A]	0.42 (0.7) [0.47]	76 (123) [76]	40 (74) [45]	
		EBR	89 (118) [96]						
WB	L	WBL	6 (8) [7]	3 (14) [6]	A (B) [A]	0.01 (0.04) [0.02]	8 (14) [5]	2 (3) [1]	20[2]
	T/R	WBT	274 (362) [295]	5 (26) [8]	A (C) [A]	0.37 (0.73) [0.41]	51 (79) [61]	26 (45) [33]	-
		WBR	94 (124) [101]						
NB	L	NBL	120 (158) [129]	41 (30) [41]	D (C) [D]	0.64 (0.61) [0.67]	37 (45) [42]	21 (26) [25]	-
	T/R	NBT	222 (293) [238]	37 (37) [36]	D (D) [D]	0.64 (0.72) [0.65]	51 (79) [66]	29 (49) [39]	-
		NBR	9 (12) [10]						
SB	L	SBL	39 (51) [41]	31 (25) [30]	C (C) [C]	0.25 (0.24) [0.27]	16 (22) [21]	8 (11) [11]	-
	T/R	SBT	133 (176) [143]	33 (34) [33]	C (C) [C]	0.51 (0.61) [0.51]	46 (64) [46]	28 (40) [29]	-
		SBR	58 (76) [62]						
Overall Intersection:			1492 (1968) [1602]	18 (26) [19]	B (C) [B]	0.48 (0.75) [0.52]	-	-	-
Colborne Street and William Street (Signalized)									
EB	L	EBL	52 (68) [55]	4 (6) [3]	A (A) [A]	0.07 (0.15) [0.08]	14 (20) [19]	7 (10) [8]	50
	T/R	EBT	261 (344) [280]	5 (10) [3]	A (A) [A]	0.34 (0.64) [0.37]	38 (45) [34]	19 (22) [16]	-
		EBR	116 (153) [124]						
WB	L	WBL	29 (38) [31]	5 (11) [5]	A (B) [A]	0.05 (0.13) [0.06]	16 (16) [17]	5 (7) [7]	50
	T	WBT	195 (257) [209]	5 (10) [6]	A (A) [A]	0.17 (0.28) [0.18]	26 (42) [30]	13 (22) [16]	-
	R	WBR	190 (250) [203]	3 (3) [3]	A (A) [A]	0.13 (0.17) [0.14]	31 (31) [33]	14 (16) [15]	70
NB	L	NBL	152 (200) [163]	40 (29) [40]	D (C) [D]	0.66 (0.58) [0.68]	45 (55) [44]	28 (31) [27]	100
	T/R	NBT	190 (250) [203]	38 (43) [38]	D (D) [D]	0.66 (0.79) [0.67]	54 (79) [58]	35 (49) [38]	-
		NBR	39 (51) [41]						
SB	L	SBL	75 (99) [81]	36 (26) [38]	D (C) [D]	0.54 (0.45) [0.58]	28 (30) [34]	14 (16) [14]	100

[2] Intersection is outside the study limit of Colborne Bridge Detailed Design project, existing storage lane length is maintained.

Approach			Volume (vph)	Delay (sec)	LOS	v/c	95th %tile Queue (m)	Average Queue (m)	Proposed Storage (m)
	T/R	SBT	88 (116) [94]	32 (31) [31]	C (C) [C]	0.31 (0.38) [0.32]	29 (41) [33]	17 (24) [17]	-
		SBR	28 (37) [30]						
Overall Intersection:			1415 (1863) [1514]	17 (19) [17]	B (B) [B]	0.41 (0.67) [0.44]	-	-	-
Colborne Street and Lindsay Street (Signalized)									
EB	T	EBT	215 (284) [231]	3 (8) [3]	A (A) [A]	0.17 (0.28) [0.19]	21 (39) [19]	8 (19) [7]	-
	R	EBR	159 (210) [171]	1 (11) [2]	A (B) [A]	0.11 (0.14) [0.12]	15 (21) [10]	6 (11) [3]	60
WB	L	WBL	133 (176) [143]	5 (5) [5]	A (A) [A]	0.17 (0.25) [0.19]	20 (29) [31]	12 (17) [17]	80
	T	WBT	350 (462) [376]	5 (6) [5]	A (A) [A]	0.28 (0.37) [0.3]	35 (57) [43]	14 (29) [22]	-
NB	L	NBL	63 (83) [68]	37 (37) [37]	D (D) [D]	0.32 (0.39) [0.34]	24 (30) [29]	14 (16) [16]	80
	R	NBR	237 (313) [255]	36 (36) [36]	D (D) [D]	0.16 (0.22) [0.18]	27 (38) [32]	17 (23) [18]	-
Overall Intersection:			1157 (1528) [1244]	12 (14) [12]	B (B) [B]	0.28 (0.4) [0.31]	-	-	-
AM (PM) [Off]									

3.2 2051 Future Conditions

The projected 2051 future conditions volumes are illustrated in Figure 4.

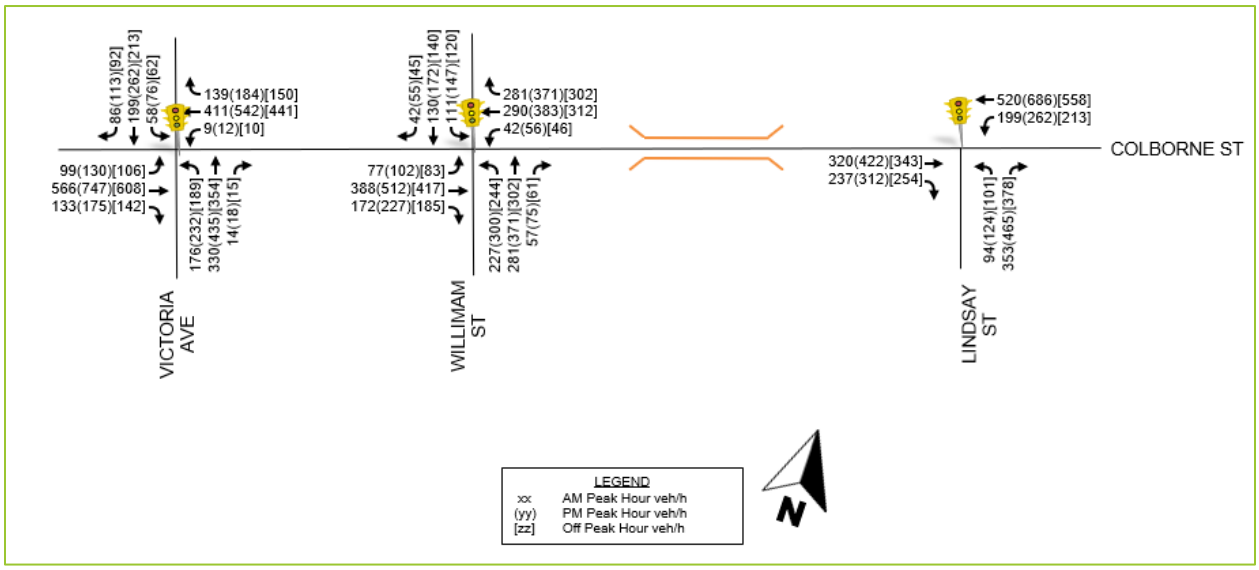

Figure 4: 2051 Projected Future Volumes

The traffic signal timings are optimized based on the estimated 2051 traffic volumes. The optimized signal timings are summarized in **Table 4.**

Table 4: 2051 Optimized Signal Timings

Phase	Amber	All-Red	Walk	FDW	AM Split	PM Split	Off Split
Colborne Street and Victoria Avenue							
2: EB	4.0	2.0	20	10	48	71	50
3: SBL	3.0	1.0	-	-	-	9	-
4: NB	4.0	2.0	15	10	42	40	40
5: EBL	3.0	1.0	-	-	-	10	-
6: WB	4.0	2.0	20	10	48	61	50
7: NBL	3.0	1.0	-	-	-	17	9
8: SB	4.0	2.0	15	10	42	32	31
				Cycle Length:	90	120	90
Colborne Street and William Street							
1: WBL	3.0	1.0	-	-	-	9	-
2: EB	3.0	2.6	7	12	47	60	45
3: SBL & WBR OV	3.0	1.0	-	-	-	12	-
4: NB	3.0	2.8	7	13	43	39	45
6: WB	3.0	2.6	7	12	47	69	45

Phase	Amber	All-Red	Walk	FDW	AM Split	PM Split	Off Split
7: NBL	3.0	1.0	-	-	-	18	-
8: SB	3.0	2.8	7	13	43	33	45
				Cycle Length:	90	120	90
Colborne Street and Victoria Avenue							
1: WBL	3.0	1.0	-	-	-	22	-
2: EB	3.0	3.5	7	12	58	55	65
4: NB	3.0	3.9	7	10	32	43	25
6: WB	3.0	3.5	7	12	58	77	65
				Cycle Length:	90	120	90

Table 5 provides a summary of the operational analysis results for 2051 conditions and the proposed storage lengths. The full Synchro HCM 2000 and SimTraffic reports can be found in **Appendix D**. Under 2051 future conditions, the following critical movements are expected to perform at LOS F, have V/C greater than 1.00, and/or have queue exceeding the available storage length:

- Colborne Street and Victoria Avenue:
  - In the AM and Off period, the 95th percentile queue of eastbound left-turn movement exceeds available existing storage.
  - In the PM period, eastbound left-turn movement has LOS F and both 95th percentile queue and average queue exceed available existing storage. Eastbound and westbound through/right movements have V/C ratio of 1.03 and 1.08, respectively. Northbound left and southbound through/right movements both have LOS F with v/c ratio of 1.00. Overall intersection has V/C ratio of 1.08.
- Colborne Street and William Street:
  - In the PM period, the 95th percentile queue of northbound left-turn movement exceeds the proposed storage lane. Note that the proposed storage length for this movement is restricted to 100m due to limited intersection spacing. The proposed storage length is able to accommodate the average queue length.

Based on the 2051 operational review, major capacity constraints are expected by 2051 ultimate horizon year at Colborne Street and Victoria Avenue intersection. It should be noted that this intersection is outside the study limit of the Colborne Bridge Detailed Design project. The City is recommended to monitor the traffic operations at this intersection closely to confirm if and when additional improvements will be required through a future study.

Table 5: 2051 Traffic Operations Summary

Approach			Volume (vph)	Delay (sec)	LOS	v/c	95th %tile Queue (m)	Average Queue (m)	Proposed Storage (m)
Colborne Street and Victoria Avenue (Signalized)									
EB	L	EBL	99 (130) [106]	13 (84) [18]	B (F) [B]	0.31 (0.94) [0.43]	33 (33) [33]	20 (23) [20]	20[2]
	T/R	EBT	566 (747) [608]	19 (66) [27]	B (E) [C]	0.73 (1.03) [0.84]	201 (227) [213]	122 (222) [127]	-
		EBR	133 (175) [142]						
WB	L	WBL	9 (12) [10]	8 (23) [11]	A (C) [B]	0.04 (0.21) [0.08]	11 (17) [14]	2 (5) [4]	20[2]
	T/R	WBT	411 (542) [441]	15 (77) [19]	B (E) [B]	0.64 (1.08) [0.74]	102 (223) [101]	65 (133) [61]	-
		WBR	139 (184) [150]						
NB	L	NBL	176 (232) [189]	51 (88) [60]	D (F) [E]	0.82 (1.00) [0.89]	52 (90) [50]	31 (50) [32]	-
	T/R	NBT	330 (435) [354]	32 (58) [28]	C (E) [C]	0.68 (0.89) [0.65]	65 (152) [74]	45 (96) [47]	-
		NBR	14 (18) [15]						
SB	L	SBL	58 (76) [62]	27 (46) [30]	C (D) [C]	0.35 (0.62) [0.33]	26 (299) [24]	14 (158) [13]	-
	T/R	SBT	199 (262) [213]	28 (94) [41]	C (F) [D]	0.55 (1.00) [0.76]	58 (254) [73]	36 (196) [44]	-
		SBR	86 (113) [92]						
Overall Intersection:			2220 (2926) [2382]	23 (73) [29]	C (E) [C]	0.76 (1.08) [0.89]	-	-	-
Colborne Street and William Street (Signalized)									
EB	L	EBL	77 (102) [83]	3 (15) [3]	A (B) [A]	0.14 (0.26) [0.16]	35 (41) [35]	13 (19) [15]	50
	T/R	EBT	388 (512) [417]	5 (29) [5]	A (C) [A]	0.58 (0.96) [0.64]	58 (77) [70]	25 (48) [37]	-
		EBR	172 (227) [185]						
WB	L	WBL	42 (56) [46]	8 (37) [9]	A (D) [A]	0.13 (0.5) [0.17]	24 (39) [30]	10 (16) [15]	50
	T	WBT	290 (383) [312]	8 (15) [9]	A (B) [A]	0.29 (0.42) [0.32]	50 (76) [60]	27 (44) [28]	-
	R	WBR	281 (371) [302]	4 (9) [4]	A (A) [A]	0.2 (0.36) [0.21]	38 (55) [51]	22 (27) [25]	70
NB	L	NBL	227 (300) [244]	42 (52) [41]	D (D) [D]	0.78 (0.87) [0.8]	60 (149) [52]	41 (85) [35]	100[3]
	T/R	NBT	281 (371) [302]	33 (75) [31]	C (E) [C]	0.69 (0.97) [0.69]	62 (202) [71]	43 (125) [47]	-
		NBR	57 (75) [61]						
SB	L	SBL	111 (147) [120]	43 (74) [44]	D (E) [D]	0.72 (0.89) [0.75]	46 (78) [46]	24 (41) [26]	100

[3] Proposed storage based on Average Queue length due to limited intersection spacing.

Approach			Volume (vph)	Delay (sec)	LOS	v/c	95th %tile Queue (m)	Average Queue (m)	Proposed Storage (m)
	T/R	SBT	130 (172) [140]	26 (45) [25]	C (D) [C]	0.34 (0.6) [0.34]	30 (30) [30]	18 (15) [15]	-
		SBR	42 (55) [45]						
Overall Intersection:			2098 (2771) [2257]	17 (37) [17]	B (D) [B]	0.64 (0.96) [0.7]	-	-	-
Colborne Street and Lindsay Street (Signalized)									
EB	T	EBT	320 (422) [343]	4 (10) [5]	A (A) [A]	0.26 (0.39) [0.28]	32 (59) [40]	15 (33) [22]	-
	R	EBR	237 (312) [254]	5 (10) [7]	A (A) [A]	0.16 (0.22) [0.17]	18 (40) [26]	8 (18) [12]	60
WB	L	WBL	199 (262) [213]	6 (6) [6]	A (A) [A]	0.29 (0.42) [0.32]	35 (70) [39]	20 (35) [22]	80
	T	WBT	520 (686) [558]	7 (8) [7]	A (A) [A]	0.42 (0.53) [0.46]	59 (99) [63]	32 (56) [38]	-
NB	L	NBL	94 (124) [101]	37 (52) [37]	D (D) [D]	0.43 (0.56) [0.45]	39 (57) [36]	20 (31) [18]	80
	R	NBR	353 (465) [378]	36 (49) [36]	D (D) [D]	0.24 (0.44) [0.26]	51 (86) [50]	30 (49) [32]	-
Overall Intersection:			1723 (2271) [1847]	13 (19) [14]	B (B) [B]	0.42 (0.56) [0.46]	-	-	-
AM (PM) [Off]									

3.3 Lindsay Street Signal Assessment

As illustrated in Section 3.1 and 3.2, Colborne Street and Lindsay Street intersection is expected to operate well with signalization at an overall LOS B for both 2031 and 2051 conditions. Although signalization is considered as part of the original scope of this project, the intersection may not necessarily need to be signalized from the traffic operations perspective. As per the City's request, a sensitivity analysis is conducted to confirm the need for signalization at this location and assess its potential operations as a stop-controlled intersection.

Signal warrant analysis is performed using the projected future volumes according to Justification 7 of OTM Book 12[1]. To estimate the 8-hour volume profiles, the following methodology is used:

- Future projected AM and PM Peak Hour Volumes (PHV) are used as is for the two peak hours
- Average hourly volumes are calculated as $(AM\ PHV + PM\ PHV)/4$ and used for each of the remaining six hours

Signal warrant analysis is conducted based on 2031 and 2051 estimated 8-hour volumes. The results are summarized in **Table 6**. The analysis results indicate that a traffic signal will not be warranted by 2031 but will be warranted by 2051 at Colborne Street and Lindsay Street intersection.

Table 6: Signal Justification Summary

Justification			Compliance	Signal Justified?
2031 Estimated Volumes				
1. Minimum Vehicular Volume	A	Total Volume	95%	No
	B	Crossing Volume	76%	
2. Delay to Cross Traffic	A	Main Road	77%	No
	B	Crossing Road	60%	
3. Combination	A	Justification 1	76%	No
	B	Justification 2	60%	
4. 4-Hr Volume			83%	No
2051 Estimated Volumes				
1. Minimum Vehicular Volume	A	Total Volume	100%	Yes
	B	Crossing Volume	100%	
2. Delay to Cross Traffic	A	Main Road	100%	No
	B	Crossing Road	80%	
3. Combination	A	Justification 1	100%	Yes
	B	Justification 2	80%	
4. 4-Hr Volume			100%	Yes

Since traffic signal is not warranted under 2031 conditions, a sensitivity analysis is conducted to evaluate the 2031 traffic operations at Colborne Street and Lindsay Street with side street stop control.

Table 7 summarizes operational results for 2031 conditions with stop control on Lindsay Street. The full Synchro HCM 2000 and SimTraffic reports can be found in **Appendix E**. As shown in **Table 7,** Colborne Street and Lindsay Street intersection is expected to operate well and no operational or queuing issues are expected with stop control on the side street approach by 2031.

Table 7: 2031 Traffic Operations Summary – Stop Control on Lindsay

Approach			Volume (vph)	Delay (sec)	LOS	v/c	95th %tile Queue (m)	Average Queue (m)	Proposed Storage (m)
Colborne Street and Lindsay Street (Stop Control)									
EB	T	EBT	215 (284) [231]	0 (0) [0]	A (A) [A]	0.14 (0.18) [0.15]	0 (2) [2]	0 (0) [0]	-
	R	EBR	159 (210) [171]	0 (0) [0]	A (A) [A]	0.10 (0.13) [0.11]	0 (6) [0]	0 (1) [0]	60
WB	L	WBL	133 (176) [143]	9 (9) [9]	A (A) [A]	0.13 (0.19) [0.14]	13 (23) [19]	8 (12) [9]	80
	T	WBT	350 (462) [376]	0 (0) [0]	A (A) [A]	0.22 (0.30) [0.24]	0 (0) [0]	0 (0) [0]	-
NB	L	NBL	63 (83) [68]	23 (49) [26]	C (E) [D]	0.25 (0.53) [0.31]	13 (25) [21]	9 (13) [12]	80
	R	NBR	237 (313) [255]	12 (14) [12]	B (B) [B]	0.32 (0.47) [0.35]	26 (30) [28]	15 (17) [15]	-
Overall Intersection:			1157 (1528) [1244]	5 (7) [5]	A (A) [A]	0.33 (0.41) [0.35]	-	-	-
AM (PM) [Off]									

4. Conclusion

This Traffic Brief report is prepared to evaluate the expected traffic operations with the presence of the proposed Colborne bridge crossing and determine road configurations and storage lane requirements, considering potential traffic and property impacts.

This study uses the assumptions and projected volumes from the 2020 Colborne Street Corridor Study as a basis to develop 2031 and 2051 future condition volumes with the presence of Colborne bridge crossing. Future traffic operations are evaluated for the weekday AM peak, Off-peak, and PM peak periods separately, with PM peak period having the highest traffic demand in all directions. With the proposed configurations and signal timings, the following conclusions can be made:

- Traffic is expected to operate well by 2031 horizon year at all locations with minimal queuing issues.
- By 2051, operations along Colborne Street bridge crossing are adequate. Some capacity issues may arise, specifically at Victoria Avenue intersection which may need to be closely monitored and improved through a future study.
- Colborne Street and Lindsay Street intersection can operate adequately as a side street stop-controlled intersection by 2031 and is warranted to be signalized by 2051.


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A

Appendix A: Raw Traffic Data

Turning Movement Count Report

Report Generated Using Turning Movement Count for Android by PortableStudies.com

Study Information

Study Summary

Count Name
Colbourne St and Victoria Ave
Location
Colbourne st and Victoria ave, Not Available
Performed By
Unknown
Date
Thursday, August 1, 2024

Notes

U = U Turn L = Left Turn T = Thru R = Right Turn
P1 = Pedestrian Direction 1 P2 = Pedestrian Direction 2
Veh = Total Vehicles for Approach

Peak Hour Volume	
833	
% Bank 1	% Bank 2
100.0%	0.0%
% Bank 3	% Bank 4
0.0%	0.0%
Pedestrians Volume	
10	

Peak Hour Data

Time Period	West Approach Colborne St							East Approach Colborne St							South Approach Victoria Ave							North Approach Victoria Ave							Total Vehicles	Total Pedestrians
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh		
12:10 PM	0	9	54	14	0	0	77	0	3	55	2	0	1	60	0	14	22	4	0	0	40	0	3	32	8	0	0	43	220	1
12:25 PM	0	7	51	8	0	0	66	0	1	54	6	0	0	61	0	8	11	2	0	0	21	0	2	19	7	0	1	28	176	1
12:40 PM	0	9	41	12	0	2	62	0	2	70	2	0	0	74	0	9	21	0	0	1	30	0	4	32	6	0	1	42	208	4
12:55 PM	0	11	50	18	1	0	79	1	0	59	5	1	0	65	0	5	32	1	1	1	38	0	1	34	12	0	0	47	229	4

Vehicle Movement Summary

Movement / Details	West Approach Colborne St							East Approach Colborne St							South Approach Victoria Ave							North Approach Victoria Ave							Entire Intersection	
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	Vehicles	Pedestrians
Movement Volume	0	36	196	52	1	2	284	1	6	238	15	1	1	260	0	36	86	7	1	2	129	0	10	117	33	0	2	160	833	10
PHF	-	0.82	0.91	0.72	0.25	0.25	0.90	0.25	0.50	0.85	0.63	0.25	0.25	0.88	-	0.64	0.67	0.44	0.25	0.50	0.81	-	0.63	0.86	0.69	-	0.50	0.85	0.91	0.63
% Bank 1	0.0%	100.0%	100.0%	100.0%				100.0%	100.0%	100.0%	100.0%				0.0%	100.0%	100.0%	100.0%				0.0%	100.0%	100.0%	100.0%					
% Bank 2	0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				**Need a custom report?**	
% Bank 3	0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				**Contact: support@portablestudies.com**	
% Bank 4	0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%	0.0%					

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Project #23-208 - McIntosh Perry

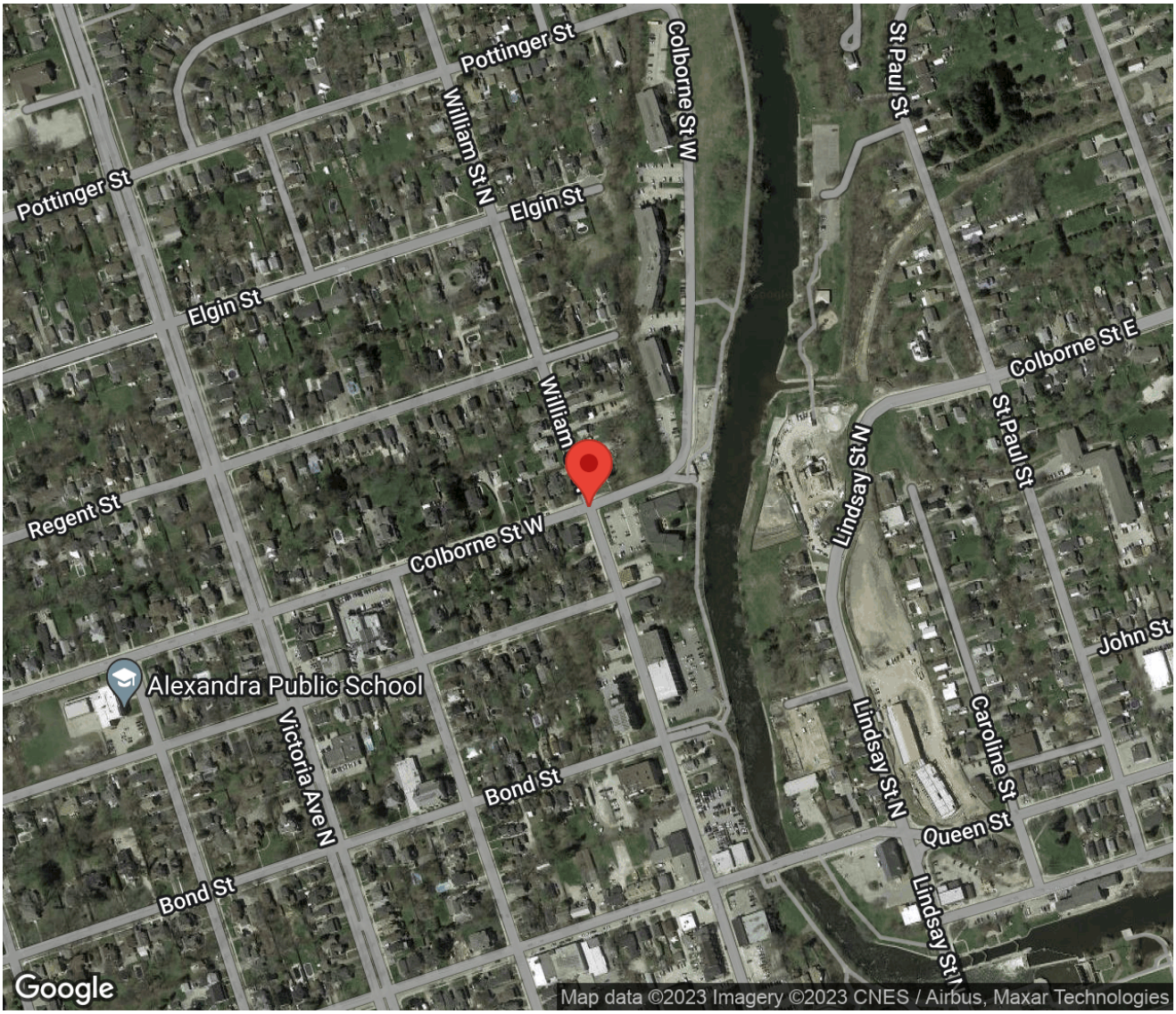
Intersection Count Report

Intersection:	William St N & Colborne St W
Municipality:	Kawartha Lakes
Count Date:	Tuesday, Jul 11, 2023
Site Code:	2320800033
Count Categories:	Cars, Trucks, Bicycles, Pedestrians
Count Period:	07:00-10:00, 11:00-13:00, 15:00-18:00
Weather:	Clear
Comments:	

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Map

Intersection:	William St N & Colborne St W
Site Code:	2320800033
Municipality:	Kawartha Lakes
Count Date:	Jul 11, 2023



Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Summary

Intersection:	William St N & Colborne St W
Site Code:	2320800033
Municipality:	Kawartha Lakes
Count Date:	Jul 11, 2023

William St N - Traffic Summary

	North Approach Totals						South Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	1	191	10	0	202	0	129	73	3	0	205	2	407
08:00 - 09:00	0	204	19	0	223	1	146	94	4	0	244	6	467
09:00 - 10:00	2	164	19	0	185	1	189	111	7	0	307	2	492
BREAK													
11:00 - 12:00	0	124	14	0	138	1	164	135	9	0	308	0	446
12:00 - 13:00	2	146	16	0	164	1	177	159	12	0	348	1	512
BREAK													
15:00 - 16:00	2	154	16	0	172	3	179	198	16	0	393	0	565
16:00 - 17:00	2	170	16	0	188	0	188	279	21	0	488	0	676
17:00 - 18:00	2	160	10	0	172	0	172	250	12	0	434	1	606
GRAND TOTAL	**11**	**1313**	**120**	**0**	**1444**	**7**	**1344**	**1299**	**84**	**0**	**2727**	**12**	**4171**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Summary

Intersection:	William St N & Colborne St W
Site Code:	2320800033
Municipality:	Kawartha Lakes
Count Date:	Jul 11, 2023

Colborne St W - Traffic Summary

	East Approach Totals						West Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	9	6	0	0	15	4	4	2	91	0	97	1	112
08:00 - 09:00	6	10	0	0	16	2	4	4	104	0	112	5	128
09:00 - 10:00	10	5	1	0	16	2	0	4	110	0	114	2	130
BREAK													
11:00 - 12:00	3	8	1	0	12	9	13	7	147	0	167	1	179
12:00 - 13:00	17	9	2	1	29	7	12	11	161	0	184	1	213
BREAK													
15:00 - 16:00	17	6	2	0	25	3	13	12	184	0	209	4	234
16:00 - 17:00	13	11	0	0	24	2	10	11	168	0	189	1	213
17:00 - 18:00	8	9	1	0	18	9	9	10	144	0	163	6	181
GRAND TOTAL	**83**	**64**	**7**	**1**	**155**	**38**	**65**	**61**	**1109**	**0**	**1235**	**21**	**1390**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

North Approach - William St N

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	
07:00	0	28	2	0	30	0	0	0	0	0	0	0	0	0	0	0
07:15	0	44	2	0	46	0	1	0	0	1	0	0	0	0	0	0
07:30	1	56	1	0	58	0	0	0	0	0	0	0	0	0	0	0
07:45	0	61	5	0	66	0	1	0	0	1	0	0	0	0	0	0
08:00	0	51	6	0	57	0	0	0	0	0	0	0	0	0	0	0
08:15	0	51	5	0	56	0	2	1	0	3	0	0	0	0	0	0
08:30	0	49	4	0	53	0	0	0	0	0	0	0	0	0	0	0
08:45	0	50	3	0	53	0	1	0	0	1	0	0	0	0	0	1
09:00	1	35	5	0	41	0	0	0	0	0	0	0	0	0	0	1
09:15	0	46	3	0	49	0	0	0	0	0	0	0	0	0	0	0
09:30	0	40	5	0	45	0	0	0	0	0	0	1	0	0	1	0
09:45	1	41	6	0	48	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	3	552	47	0	602	0	6	1	0	7	0	1	0	0	1	2

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

North Approach - William St N

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
11:00	0	35	5	0	40	0	2	0	0	2	0	1	0	0	1	1
11:15	0	30	4	0	34	0	0	0	0	0	0	0	0	0	0	0
11:30	0	27	2	0	29	0	0	0	0	0	0	0	0	0	0	0
11:45	0	29	3	0	32	0	0	0	0	0	0	0	0	0	0	0
12:00	1	31	1	0	33	0	2	0	0	2	0	0	0	0	0	0
12:15	0	42	7	0	49	0	1	0	0	1	0	0	0	0	0	0
12:30	0	24	4	0	28	0	0	0	0	0	0	0	0	0	0	1
12:45	1	46	3	0	50	0	0	0	0	0	0	0	1	0	1	0
SUBTOTAL	2	264	29	0	295	0	5	0	0	5	0	1	1	0	2	2

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

North Approach - William St N

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	1	35	6	0	42	0	4	0	0	4	0	0	0	0	0	1
15:15	0	27	3	0	30	0	1	0	0	1	0	0	0	0	0	1
15:30	1	38	2	0	41	0	2	0	0	2	0	0	0	0	0	0
15:45	0	45	5	0	50	0	1	0	0	1	0	1	0	0	1	1
16:00	0	42	2	0	44	0	0	0	0	0	0	0	0	0	0	0
16:15	1	38	7	0	46	0	2	0	0	2	0	0	0	0	0	0
16:30	0	31	5	0	36	0	0	0	0	0	0	0	0	0	0	0
16:45	1	57	2	0	60	0	0	0	0	0	0	0	0	0	0	0
17:00	2	30	4	0	36	0	0	0	0	0	0	0	0	0	0	0
17:15	0	32	1	0	33	0	1	0	0	1	0	2	0	0	2	0
17:30	0	50	4	0	54	0	2	0	0	2	0	0	0	0	0	0
17:45	0	42	1	0	43	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	6	467	42	0	515	0	14	0	0	14	0	3	0	0	3	3
GRAND TOTAL	11	1283	118	0	1412	0	25	1	0	26	0	5	1	0	6	7

Ontario Traffic Inc.
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Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

South Approach - William St N

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	18	12	0	0	30	1	1	0	0	2	0	0	0	0	0	0
07:15	25	16	1	0	42	2	0	0	0	2	0	0	0	0	0	1
07:30	36	15	1	0	52	1	0	0	0	1	0	0	0	0	0	1
07:45	45	28	1	0	74	1	1	0	0	2	0	0	0	0	0	0
08:00	32	17	2	0	51	1	1	0	0	2	0	0	0	0	0	0
08:15	36	19	0	0	55	1	1	0	0	2	0	0	0	0	0	0
08:30	29	21	1	0	51	1	1	0	0	2	0	0	0	0	0	3
08:45	45	33	1	0	79	1	1	0	0	2	0	0	0	0	0	3
09:00	41	33	0	0	74	1	3	0	0	4	0	0	0	0	0	0
09:15	45	26	1	0	72	2	0	0	0	2	0	0	0	0	0	0
09:30	49	16	4	0	69	0	0	0	0	0	0	0	0	0	0	2
09:45	49	32	2	0	83	1	1	0	0	2	1	0	0	0	1	0
SUBTOTAL	450	268	14	0	732	13	10	0	0	23	1	0	0	0	1	10

Ontario Traffic Inc.
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Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

South Approach - William St N

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
11:00	38	38	2	0	78	0	1	0	0	1	0	0	0	0	0	0
11:15	32	31	2	0	65	3	0	0	0	3	0	0	0	0	0	0
11:30	42	34	4	0	80	2	2	0	0	4	0	0	0	0	0	0
11:45	43	29	0	0	72	4	0	1	0	5	0	0	0	0	0	0
12:00	47	42	5	0	94	0	3	0	0	3	0	0	0	0	0	0
12:15	44	31	3	0	78	0	0	0	0	0	0	1	0	0	1	0
12:30	36	40	2	0	78	0	0	0	0	0	0	2	0	0	2	0
12:45	48	38	2	0	88	2	1	0	0	3	0	1	0	0	1	1
SUBTOTAL	330	283	20	0	633	11	7	1	0	19	0	4	0	0	4	1

Ontario Traffic Inc.
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Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

South Approach - William St N

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	38	49	5	0	92	0	3	0	0	3	0	0	0	0	0	0
15:15	49	47	2	0	98	0	0	0	0	0	0	0	0	0	0	0
15:30	51	51	4	0	106	1	1	0	0	2	0	0	0	0	0	0
15:45	39	46	5	0	90	1	1	0	0	2	0	0	0	0	0	0
16:00	51	64	5	0	120	1	1	0	0	2	0	1	0	0	1	0
16:15	40	65	3	0	108	2	2	0	0	4	0	0	0	0	0	0
16:30	50	88	8	0	146	0	0	0	0	0	0	0	0	0	0	0
16:45	42	56	4	0	102	2	2	1	0	5	0	0	0	0	0	0
17:00	50	76	5	0	131	1	2	0	0	3	0	0	0	0	0	0
17:15	35	58	1	0	94	1	0	0	0	1	0	0	0	0	0	0
17:30	46	55	2	0	103	0	0	0	0	0	0	0	0	0	0	1
17:45	38	58	4	0	100	1	1	0	0	2	0	0	0	0	0	0
SUBTOTAL	529	713	48	0	1290	10	13	1	0	24	0	1	0	0	1	1
GRAND TOTAL	1309	1264	82	0	2655	34	30	2	0	66	1	5	0	0	6	12

Ontario Traffic Inc.
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Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

East Approach - Colborne St W

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	3	2	0	0	5	0	0	0	0	0	0	0	0	0	0	0
07:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
07:30	3	2	0	0	5	0	0	0	0	0	0	0	0	0	0	1
07:45	2	1	0	0	3	1	0	0	0	1	0	0	0	0	0	0
08:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:15	2	3	0	0	5	1	0	0	0	1	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	2	6	0	0	8	1	0	0	0	1	0	0	0	0	0	1
09:00	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	1
09:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
09:30	4	2	0	0	6	0	0	0	0	0	0	0	0	0	0	0
09:45	3	1	1	0	5	1	0	0	0	1	0	0	0	0	0	0
SUBTOTAL	21	21	1	0	43	4	0	0	0	4	0	0	0	0	0	8

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

East Approach - Colborne St W

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	3
11:15	1	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0
11:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
11:45	1	0	1	0	2	1	1	0	0	2	0	0	0	0	0	4
12:00	2	3	0	1	6	0	0	0	0	0	0	0	0	0	0	2
12:15	4	3	0	0	7	0	0	0	0	0	0	0	0	0	0	0
12:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
12:45	9	3	2	0	14	1	0	0	0	1	0	0	0	0	0	3
SUBTOTAL	18	16	3	1	38	2	1	0	0	3	0	0	0	0	0	16

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

East Approach - Colborne St W

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
15:15	6	0	0	0	6	0	1	0	0	1	0	0	0	0	0	3
15:30	5	0	2	0	7	0	0	0	0	0	0	0	0	0	0	0
15:45	4	3	0	0	7	1	1	0	0	2	0	0	0	0	0	0
16:00	6	1	0	0	7	0	0	0	0	0	0	0	0	0	0	2
16:15	1	5	0	0	6	0	0	0	0	0	0	0	0	0	0	0
16:30	1	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0
16:45	4	2	0	0	6	1	0	0	0	1	0	0	0	0	0	0
17:00	3	2	1	0	6	0	0	0	0	0	0	0	0	0	0	2
17:15	3	4	0	0	7	0	0	0	0	0	0	0	0	0	0	0
17:30	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	3
17:45	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	4
SUBTOTAL	36	24	3	0	63	2	2	0	0	4	0	0	0	0	0	14
GRAND TOTAL	**75**	**61**	**7**	**1**	**144**	**8**	**3**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**38**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

West Approach - Colborne St W

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	1	0	13	0	14	0	0	0	0	0	0	0	0	0	0	0
07:15	1	1	23	0	25	0	0	0	0	0	0	0	0	0	0	0
07:30	1	0	25	0	26	0	0	1	0	1	0	0	0	0	0	0
07:45	1	1	28	0	30	0	0	1	0	1	0	0	0	0	0	1
08:00	0	0	20	0	20	0	0	1	0	1	0	0	0	0	0	1
08:15	2	1	28	0	31	0	1	0	0	1	0	0	0	0	0	2
08:30	1	1	21	0	23	0	0	2	0	2	0	0	0	0	0	1
08:45	1	1	32	0	34	0	0	0	0	0	0	0	0	0	0	1
09:00	0	1	26	0	27	0	0	1	0	1	0	0	0	0	0	2
09:15	0	1	23	0	24	0	0	2	0	2	0	0	0	0	0	0
09:30	0	2	23	0	25	0	0	1	0	1	0	0	0	0	0	0
09:45	0	0	34	0	34	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	8	9	296	0	313	0	1	9	0	10	0	0	0	0	0	8

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

West Approach - Colborne St W

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
11:00	1	2	32	0	35	1	0	2	0	3	0	0	0	0	0	1
11:15	2	1	33	0	36	0	0	1	0	1	0	0	0	0	0	0
11:30	5	2	41	0	48	0	0	1	0	1	0	0	0	0	0	0
11:45	4	2	36	0	42	0	0	1	0	1	0	0	0	0	0	0
12:00	3	2	41	0	46	0	0	0	0	0	0	0	0	0	0	1
12:15	1	1	43	0	45	0	0	3	0	3	0	0	0	0	0	0
12:30	5	3	35	0	43	0	0	1	0	1	0	0	0	0	0	0
12:45	3	5	38	0	46	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	24	18	299	0	341	1	0	9	0	10	0	0	0	0	0	2

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: William St N & Colborne St W
Site Code: 2320800033
Municipality: Kawartha Lakes
Count Date: Jul 11, 2023

West Approach - Colborne St W

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	
15:00	2	0	53	0	55	0	0	0	0	0	0	0	0	0	0	1
15:15	2	3	39	0	44	0	0	0	0	0	0	0	0	0	0	3
15:30	4	4	43	0	51	0	0	4	0	4	0	0	0	0	0	0
15:45	5	5	43	0	53	0	0	2	0	2	0	0	0	0	0	0
16:00	4	4	40	0	48	0	0	1	0	1	0	0	0	0	0	0
16:15	1	3	43	0	47	0	0	7	0	7	0	0	0	0	0	0
16:30	3	0	34	0	37	0	0	0	0	0	0	0	0	0	0	0
16:45	2	4	42	0	48	0	0	1	0	1	0	0	0	0	0	1
17:00	2	2	44	0	48	0	0	1	0	1	0	0	0	0	0	1
17:15	2	3	45	0	50	0	0	0	0	0	0	0	0	0	0	3
17:30	1	3	31	0	35	0	0	1	0	1	0	0	0	0	0	2
17:45	2	2	21	0	25	2	0	1	0	3	0	0	0	0	0	0
SUBTOTAL	30	33	478	0	541	2	0	18	0	20	0	0	0	0	0	11
GRAND TOTAL	62	60	1073	0	1195	3	1	36	0	40	0	0	0	0	0	21

Peak Hour Diagram

Specified Period
From: 07:00:00
To: 10:00:00

One Hour Peak
From: 08:45:00
To: 09:45:00

Intersection: William St N & Colborne St W
Site Code: 2320800033
Count Date: Jul 11, 2023

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: William St N runs N/S

North Approach

	Out	In	Total
Cars	188	109	297
Trucks	1	4	5
Bicycles	1	0	1
	190	**113**	**303**

William St N

Bicycles	0	1	0	0
Trucks	0	1	0	0
Cars	16	171	1	0
Totals	**16**	**173**	**1**	**0**

Peds: 2

East Approach

	Out	In	Total
Cars	18	12	30
Trucks	1	0	1
Bicycles	0	0	0
	19	**12**	**31**

Colborne St W

Bicycles	Trucks	Cars	Totals	
0	0	0	**0**	
0	0	1	**1**	
0	0	5	**5**	
0	4	104	**108**	

Peds: 3

Peds: 3

Colborne St W

	Totals	Cars	Trucks	Bicycles
	0	0	0	0
	0	0	0	0
	10	10	0	0
	9	8	1	0

Peds: 5

West Approach

	Out	In	Total
Cars	110	206	316
Trucks	4	4	8
Bicycles	0	0	0
	114	**210**	**324**

William St N

Totals	**184**	**112**	**6**	**0**
Cars	180	108	6	0
Trucks	4	4	0	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	294	283	577
Trucks	8	6	14
Bicycles	0	1	1
	302	**290**	**592**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: William St N & Colborne St W
Site Code: 2320800033
Count Date: Jul 11, 2023
Period: 07:00 - 10:00

Peak Hour Data (08:45 - 09:45)

Start Time	North Approach William St N						South Approach William St N						East Approach Colborne St W						West Approach Colborne St W						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
08:45	0	51	3	0	1	54	46	34	1	0	3	81	3	6	0	0	1	9	1	1	32	0	1	34	178
09:00	1	35	5	0	1	41	42	36	0	0	0	78	2	1	0	0	1	3	0	1	27	0	2	28	150
09:15	0	46	3	0	0	49	47	26	1	0	0	74	0	1	0	0	1	1	0	1	25	0	0	26	150
09:30	0	41	5	0	0	46	49	16	4	0	2	69	4	2	0	0	0	6	0	2	24	0	0	26	147
Grand Total	**1**	**173**	**16**	**0**	**2**	**190**	**184**	**112**	**6**	**0**	**5**	**302**	**9**	**10**	**0**	**0**	**3**	**19**	**1**	**5**	**108**	**0**	**3**	**114**	**625**
Approach %	0.5	91.1	8.4	0		-	60.9	37.1	2	0		-	47.4	52.6	0	0		-	0.9	4.4	94.7	0		-	
Totals %	0.2	27.7	2.6	0		30.4	29.4	17.9	1	0		48.3	1.4	1.6	0	0		3	0.2	0.8	17.3	0		18.2	
PHF	**0.25**	**0.85**	**0.8**	**0**		**0.88**	**0.94**	**0.78**	**0.38**	**0**		**0.93**	**0.56**	**0.42**	**0**	**0**		**0.53**	**0.25**	**0.63**	**0.84**	**0**		**0.84**	**0.88**
Cars	1	171	16	0		188	180	108	6	0		294	8	10	0	0		18	1	5	104	0		110	610
% Cars	100	98.8	100	0		98.9	97.8	96.4	100	0		97.4	88.9	100	0	0		94.7	100	100	96.3	0		96.5	97.6
Trucks	0	1	0	0		1	4	4	0	0		8	1	0	0	0		1	0	0	4	0		4	14
% Trucks	0	0.6	0	0		0.5	2.2	3.6	0	0		2.6	11.1	0	0	0		5.3	0	0	3.7	0		3.5	2.2
Bicycles	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	1
% Bicycles	0	0.6	0	0		0.5	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0.2
Peds					2	-					5	-					3	-					3	-	13
% Peds					15.4	-					38.5	-					23.1	-					23.1	-	

Peak Hour Diagram

Specified Period
From: 11:00:00
To: 13:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Intersection: William St N & Colborne St W
Site Code: 2320800033
Count Date: Jul 11, 2023

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: William St N runs N/S

North Approach

	Out	In	Total
Cars	160	165	325
Trucks	3	4	7
Bicycles	1	4	5
	164	**173**	**337**

William St N

Bicycles	1	0	0	0
Trucks	0	3	0	0
Cars	15	143	2	0
Totals	**16**	**146**	**2**	**0**

East Approach

	Out	In	Total
Cars	28	26	54
Trucks	1	0	1
Bicycles	0	0	0
	29	**26**	**55**

Peds: 1

Colborne St W

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	12	**12**
0	0	11	**11**
0	4	157	**161**

Peds: 1

Peds: 7

Colborne St W

	Totals	Cars	Trucks	Bicycles
	1	1	0	0
	2	2	0	0
	9	9	0	0
	17	16	1	0

Peds: 1

West Approach

	Out	In	Total
Cars	180	199	379
Trucks	4	2	6
Bicycles	0	1	1
	184	**202**	**386**

Totals	**177**	**159**	**12**	**0**
Cars	175	151	12	0
Trucks	2	4	0	0
Bicycles	0	4	0	0

William St N

South Approach

	Out	In	Total
Cars	338	316	654
Trucks	6	8	14
Bicycles	4	0	4
	348	**324**	**672**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection:	William St N & Colborne St W
Site Code:	2320800033
Count Date:	Jul 11, 2023
Period:	11:00 - 13:00

Peak Hour Data (12:00 - 13:00)

Start Time	North Approach William St N						South Approach William St N						East Approach Colborne St W						West Approach Colborne St W						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
12:00	1	33	1	0	0	35	47	45	5	0	0	97	2	3	0	1	2	6	3	2	41	0	1	46	184
12:15	0	43	7	0	0	50	44	32	3	0	0	79	4	3	0	0	0	7	1	1	46	0	0	48	184
12:30	0	24	4	0	1	28	36	42	2	0	0	80	1	0	0	0	2	1	5	3	36	0	0	44	153
12:45	1	46	4	0	0	51	50	40	2	0	1	92	10	3	2	0	3	15	3	5	38	0	0	46	204
Grand Total	**2**	**146**	**16**	**0**	**1**	**164**	**177**	**159**	**12**	**0**	**1**	**348**	**17**	**9**	**2**	**1**	**7**	**29**	**12**	**11**	**161**	**0**	**1**	**184**	**725**
Approach %	1.2	89	9.8	0		-	50.9	45.7	3.4	0		-	58.6	31	6.9	3.4		-	6.5	6	87.5	0		-	
Totals %	0.3	20.1	2.2	0		22.6	24.4	21.9	1.7	0		48	2.3	1.2	0.3	0.1		4	1.7	1.5	22.2	0		25.4	
PHF	**0.5**	**0.79**	**0.57**	**0**		**0.8**	**0.89**	**0.88**	**0.6**	**0**		**0.9**	**0.43**	**0.75**	**0.25**	**0.25**		**0.48**	**0.6**	**0.55**	**0.88**	**0**		**0.96**	**0.89**
Cars	2	143	15	0		160	175	151	12	0		338	16	9	2	1		28	12	11	157	0		180	706
% Cars	100	97.9	93.8	0		97.6	98.9	95	100	0		97.1	94.1	100	100	100		96.6	100	100	97.5	0		97.8	97.4
Trucks	0	3	0	0		3	2	4	0	0		6	1	0	0	0		1	0	0	4	0		4	14
% Trucks	0	2.1	0	0		1.8	1.1	2.5	0	0		1.7	5.9	0	0	0		3.4	0	0	2.5	0		2.2	1.9
Bicycles	0	0	1	0		1	0	4	0	0		4	0	0	0	0		0	0	0	0	0		0	5
% Bicycles	0	0	6.3	0		0.6	0	2.5	0	0		1.1	0	0	0	0		0	0	0	0	0		0	0.7
Peds					1	-					1	-					7	-					1	-	10
% Peds					10	-					10	-					70	-					10	-	

Peak Hour Diagram

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Specified Period		One Hour Peak	
From:	15:00:00	From:	16:15:00
To:	18:00:00	To:	17:15:00

Intersection: William St N & Colborne St W
Site Code: 2320800033
Count Date: Jul 11, 2023

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: William St N runs N/S

North Approach

	Out	In	Total
Cars	178	294	472
Trucks	2	6	8
Bicycles	0	0	0
	180	**300**	**480**

William St N

Bicycles	0	0	0	0
Trucks	0	2	0	0
Cars	18	156	4	0
Totals	**18**	**158**	**4**	**0**

East Approach

	Out	In	Total
Cars	22	33	55
Trucks	1	1	2
Bicycles	0	0	0
	23	**34**	**57**

Colborne St W

Bicycles	Trucks	Cars	Totals	
0	0	0	**0**	
0	0	8	**8**	
0	0	9	**9**	
0	9	163	**172**	

Peds: 2

Peds: 2

Peds: 0

Colborne St W

Totals	Cars	Trucks	Bicycles
0	0	0	0
1	1	0	0
12	12	0	0
10	9	1	0

West Approach

	Out	In	Total
Cars	180	212	392
Trucks	9	5	14
Bicycles	0	0	0
	189	**217**	**406**

Peds: 0

William St N

Totals	**187**	**291**	**21**	**0**
Cars	182	285	20	0
Trucks	5	6	1	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	487	328	815
Trucks	12	12	24
Bicycles	0	0	0
	499	**340**	**839**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: William St N & Colborne St W
Site Code: 2320800033
Count Date: Jul 11, 2023
Period: 15:00 - 18:00

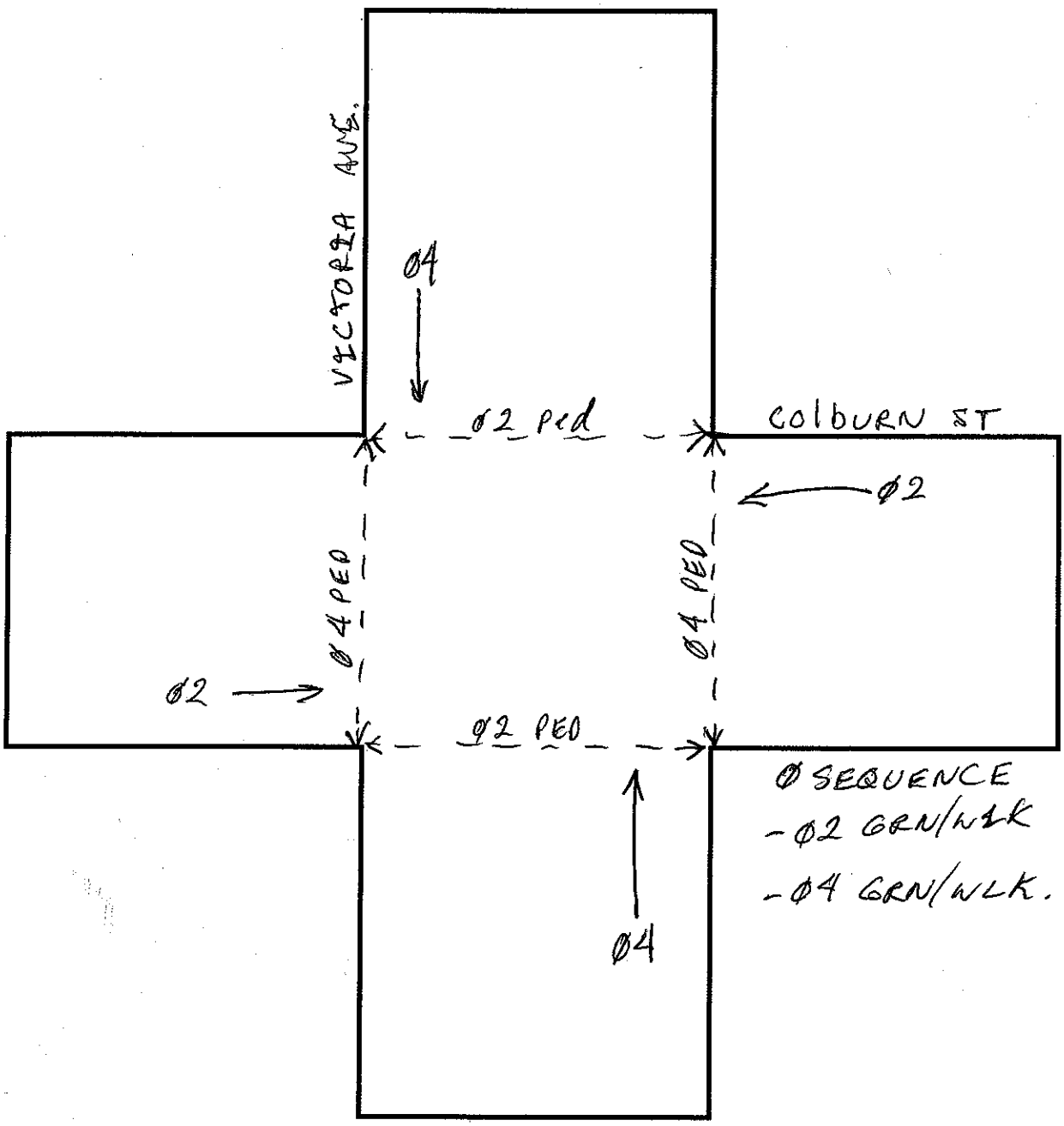
Peak Hour Data (16:15 - 17:15)

Start Time	North Approach William St N						South Approach William St N						East Approach Colborne St W						West Approach Colborne St W						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
16:15	1	40	7	0	0	48	42	67	3	0	0	112	1	5	0	0	0	6	1	3	50	0	0	54	220
16:30	0	31	5	0	0	36	50	88	8	0	0	146	1	3	0	0	0	4	3	0	34	0	0	37	223
16:45	1	57	2	0	0	60	44	58	5	0	0	107	5	2	0	0	0	7	2	4	43	0	1	49	223
17:00	2	30	4	0	0	36	51	78	5	0	0	134	3	2	1	0	2	6	2	2	45	0	1	49	225
Grand Total	**4**	**158**	**18**	**0**	**0**	**180**	**187**	**291**	**21**	**0**	**0**	**499**	**10**	**12**	**1**	**0**	**2**	**23**	**8**	**9**	**172**	**0**	**2**	**189**	**891**
Approach %	2.2	87.8	10	0		-	37.5	58.3	4.2	0		-	43.5	52.2	4.3	0		-	4.2	4.8	91	0		-	
Totals %	0.4	17.7	2	0		20.2	21	32.7	2.4	0		56	1.1	1.3	0.1	0		2.6	0.9	1	19.3	0		21.2	
PHF	**0.5**	**0.69**	**0.64**	**0**		**0.75**	**0.92**	**0.83**	**0.66**	**0**		**0.85**	**0.5**	**0.6**	**0.25**	**0**		**0.82**	**0.67**	**0.56**	**0.86**	**0**		**0.88**	**0.99**
Cars	4	156	18	0		178	182	285	20	0		487	9	12	1	0		22	8	9	163	0		180	867
% Cars	100	98.7	100	0		98.9	97.3	97.9	95.2	0		97.6	90	100	100	0		95.7	100	100	94.8	0		95.2	97.3
Trucks	0	2	0	0		2	5	6	1	0		12	1	0	0	0		1	0	0	9	0		9	24
% Trucks	0	1.3	0	0		1.1	2.7	2.1	4.8	0		2.4	10	0	0	0		4.3	0	0	5.2	0		4.8	2.7
Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
Peds					0	-					0	-					2	-					2	-	4
% Peds					0	-					0	-					50	-					50	-	

City of Kawartha Lakes

Date: MAR. 31/10

Intersection:	COLBURN @ VICTORIA.
controller type:	NAZTEC 980852T1 (2009)
monitor type:	NAZTEC 512 LCD



Ø SEQUENCE
- Ø2 GRN/WLK
- Ø4 GRN/WLK.

Phase Times [1.1.1]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Grn		30		12												
Gap, Ext		4		4												
Max 1		30		25												
Max 2		—		—												
Yel Clr		4		4												
Red Clr		2		2												
Walk		20		15												
Ped Clr		10		10												
Red Revt																
Add Init																
Max Init																

Gap Reduction																
Time B4																
Cars B4																
Time To																
ReducBy																
Min Gap																
DyMaxLim																
Max Step																

Phase Options [1.1.2]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Enable		✓		✓												
Min Recall		✓														
Max Recall																
Ped Recall		✓														
Soft Recall																
Don't Lock																
A Flash Entry																
A Flash Exit																
Dual Entry		✓		✓		✓		✓								
Simul Gap	✓	✓	✓	✓	✓	✓	✓	✓								
Gaur Passage																
Rest In Walk		✓														
Cond Service																
Non-Act 1		✓														
Non-Act 2																
Add Init Calc																

Phase Options+ [1.1.3]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Reservice																
Walk Thru Yel																
Skip Red																
Red Rest																
Max II																
Conflicting Φ																
Conflicting Φ																
Omit Yel																
Ped Out/Olap																
Start Yel																

Ring, Start, Concurrency [1.1.4]

Phase	Ring	Start Up	Concurrent Phases							
1	1	RED								
2	1	RED								
3	1	RED								
4	1	RED								
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										

Preemption 1, Times [3.1]

Delay		MinGrn		Track Grn	
MinDura		MinWlk		Min Dwell	
MaxPres		PedClr			

Preemption 1, Phases [3.2]

Track Veh								
Dwell Veh								
Dwell (more)								
Dwell Ped								
Exit								

Preemption 1, Options [3.3]

Lock Input	
Override Auto Flash	
Override Higher # Preempt	
Flash in Dwell	
Link to Preempt #	

Preemption 1, Times+ [3.4]

Extend Call	

PedClr	
Yel	
Red	

Preemption 1, Overlaps+ [3.5]

Track								
(more)								
Dwell								
(more)								

Preemption 1, Options+ [3.6]

Enable	
Type	
Output	

Pattern	
Skip if Override	

Preemption 2, Times [3.1]

Delay		MinGrn		Track Grn	
MinDura		MinWlk		Min Dwell	
MaxPres		PedClr			

Preemption 2, Phases [3.2]

Track Veh								
Dwell Veh								
Dwell (more)								
Dwell Ped								
Exit								

Preemption 2, Options [3.3]

Lock Input	
Override Auto Flash	
Override Higher # Preempt	
Flash in Dwell	
Link to Preempt #	

Preemption 2, Times+ [3.4]

Extend Dwell	

PedClr	
Yel	
Red	

Preemption 2, Overlaps+ [3.5]

Track								
(more)								
Dwell								
(more)								

Preemption 2, Options+ [3.6]

Enable	
Type	
Output	

Pattern	
Skip if Override	
Coord + Preempt	

B

Appendix B: 2020 Colborne Street Corridor Study

City of Kawartha Lakes
Colborne Street Schedule B
Class Environmental Assessment and Corridor Study

Project File Report

July 2020

HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8

EXECUTIVE SUMMARY

The City of Kawartha Lakes is responsible for monitoring and managing growth within its municipal borders and implementing required transportation network improvements in a strategic and timely manner. The City's ***Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan*** ("TMP", February 2012), has identified existing and future improvement needs for Colborne Street West from Highway 35 to William Street in the Town of Lindsay.

To further assess the existing and future corridor needs, the City has initiated a corridor operations study following the Schedule B Class Environmental Assessment (EA) process for Colborne Street West under the ***Municipal Class Environmental Assessment*** (October 2000, as amended in 2007, 2011 and 2015). The limits of the EA for Colborne Street West are from Highway 35 to William Street North.

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031. The bulk of this growth is expected to occur within Lindsay, and as a result, traffic volumes are expected to increase anywhere between 50% to over 200% compared to 2013 traffic volumes, depending on the location. As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes without improvements to address increased vehicle-vehicle and vehicle-pedestrian conflicts.

Transportation solutions are necessary to enhance the safety and mobility of motorists, pedestrians, and cyclists along the corridor, and to address projected capacity deficiencies. This includes maintaining and enhancing the character of the existing Colborne Street corridor through streetscaping opportunities, while enhancing the transportation system and providing increased capacity.

The Class Environmental Assessment process requires documentation and examination of all reasonable alternatives, or means to address the problem, referred to as planning alternatives. An evaluation is undertaken to ensure that the process is traceable and reproducible, and that technical, social, economic, and environmental concerns are considered as part of the evaluation process. Each of the planning alternatives considered presented a different approach to address the problems and opportunities identified for this EA. To determine the most appropriate functional solution for the corridor, advantages and disadvantages of each planning alternative were identified and evaluated to determine the best functional solution.

The City of Kawartha Lakes conducted a consultation program that extended beyond the requirements of the ***Municipal Class Environmental Assessment (Schedule 'B')***, which included: newspaper advertisements; mailings; website updates, two stakeholder meetings; and two Public Open Houses. Comments and questions received from the public and stakeholders via comment sheets, verbal

questions, letters, e-mails, and telephone calls were compiled and considered in the analysis and evaluation of alternative solutions.

Based on the analysis of existing and future traffic conditions, the evaluation of alternatives and design concepts, and the consideration of existing constraints, the preferred solution for the Colborne Street corridor will be to:

- widen to four through-lanes from Highway 35 to east of St. Joseph Road, with multi-use paths on both sides of the road;
- transition to a 3-lane cross-section with centre two-way left-turn lane west of Charles Street, with a multi-use path on the south side of the road;
- maintain the 3-lane cross-section to Angeline Street with the centre two-way left-turn lane becoming an exclusive eastbound left-turn lane at Angeline Street, and also provide an exclusive eastbound right-turn lane and a multi-use path on the south side;
- provide a 2-lane cross-section from Angeline Street to William Street, widen sidewalks on both sides of the road and provide a new sidewalk on the south side of the road between Victoria Avenue and Cambridge Street, increase boulevard, and maintain a parking lane on the north side of the road from Adelaide Street continuing to the east;
- separate the eastbound left-turn lane at the intersection of Victoria Street, which should be able to be accomplished through restriping;
- install a new traffic signal at Albert Street;
- undertake geometric improvements at William Street intersection including installation of a new traffic signal;
- coordinate geometric improvements at the intersection of Colborne Street and Highway 35 with the Mason Homes / Jennings Creek Traffic Impact Study, including potential widening of approaches on Highway 35 and Colborne Street to 4-lane cross-sections; and,
- improve transit service in line with future development (including Jennings Creek Development Plan Area) and coordinate improvements through a town-wide or city-wide Transit Strategy or Transit Master Plan.

The proposed solution to improve the operations to the intersection of Colborne Street at Angeline Street involves the widening of Angeline Street from two lanes to four lanes in each direction. These improvements would be the subject of a separate EA for the widening of Angeline Street intersection; consequently, the ultimate intersection configuration to meet 2031 demands cannot be finalized at this time.

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Appendices

1 INTRODUCTION

The City of Kawartha Lakes is responsible for monitoring and managing growth within its municipal borders and implementing required transportation network improvements in a strategic and timely manner. As such, the City's ***Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan*** ("TMP", February 2012), has identified existing and future improvement needs for Colborne Street West from Highway 35 to William Street in the Town of Lindsay.

To further assess the existing and future corridor needs, the City has initiated a corridor operations study following the Municipal Class Environmental Assessment (EA) process for two of its primary east-west corridors, Colborne Street West and Kent Street West. The limits of this operations study for Colborne Street West are from Highway 35 to William Street North. For Kent Street West the limits are from Highway 35 to Lindsay Street North.

Given the proximity of these two corridors and the connection and interaction of north-south streets between these two arterial roads, the corridor studies were conducted at the same time. This report addresses the study findings and recommendations for Colborne Street only; the findings for Kent Street are documented under separate cover.

1.1 Study Purpose and Objectives

The purpose of this study is to determine the specific transportation needs for the Colborne Street corridor from Highway 35 to William Street, identifying improvements to both safety and accessibility within the corridors while maintaining or increasing capacity of the road network to accommodate future growth. First and foremost, this study is an operational review, which has been carried out as a ***Schedule 'B'*** Class EA following Phases 1 and 2, in accordance with the Municipal Engineers Association, ***Municipal Class Environmental Assessment*** (October 2000, as amended in 2007, 2011 and 2015). The Schedule B was recommended based on the assessment of the existing and future needs and opportunities for improvements.

One key component to the EA process is the requirement to justify the need for modifications to the corridor (Phase 1). The needs assessment involves the identification and evaluation of existing and future deficiencies and opportunities to improve the transportation network with respect to network capacity, traffic safety, design and operation. This Project File Report documents the needs assessment and the alternative solutions considered (Phase 2) and the decision-making process leading to the selection of preferred solutions for Colborne Street.

In a Schedule 'B' EA, the project may be considered Approved subject to Screening. The screening means you can undertake proposed improvements subject to comments/approval from agencies and members of the public. Upon issuance of the Notice of Completion and end of the minimum 30-day review period, if no request for a Part II Order is received by the Minister within the review period, then the City may develop the project, based on the preferred solution, and proceed with detailed design and the preparation of contract drawings and documents.

1.2 Project Location and Study Area

The Colborne Street corridor from Highway 35 to William Street is located in the Town of Lindsay on the west side of the Scugog River. The study area limits for both corridor studies are shown in **Exhibit** 1-1.

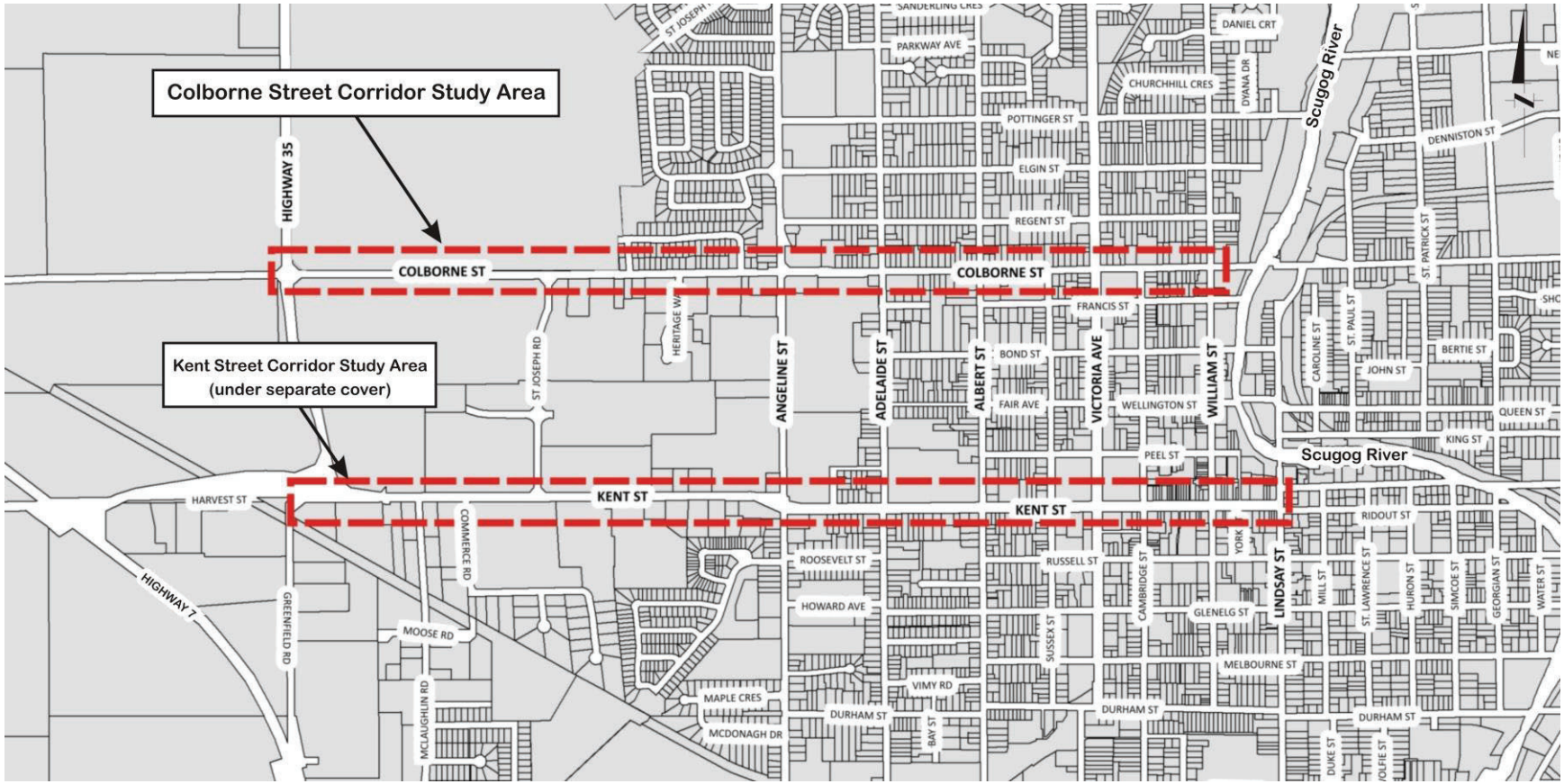


Exhibit 1-1: Colborne Street Corridor Study Area

1.3 Background

Colborne Street is an arterial road with two through travel lanes (one lane per direction) within the study limits. Turn lanes are only provided at the intersection of Angeline Street, curb parking is permitted in some sections, and sidewalks are generally provided on both sides where the adjacent lands are developed.

The corridor is surrounded primarily with residential uses in the east and central sections (east of St. Joseph Road). Schools and retirement homes and City Hall are also located along Colborne Street. Colborne Street also serves Wilson Fields in the west end and will also serve future development within the NW quadrant of the Town including the Jennings Creek Development Plan Area.

On-street parking is permitted on the north side of the street, east of Adelaide Street and on the south side, west of St. Joseph Road; however, there are no posted parking restrictions on other sections of Colborne Street. While Colborne Street currently does not cross the Scugog River, Colborne Street is the only continuous east-west arterial road (other than Kent Street) serving the Town of Lindsay west of the Scugog River.

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031; a population increase of approximately 33% from 2011 (last Census available at time of reporting). Much of this growth is expected to occur within the Town of Lindsay, and as a result, traffic volumes on various town roads are expected to increase anywhere between 50% to over 200% compared to 2013 traffic volumes.

As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes. Colborne Street will require mitigation measures and improvements to either accommodate or manage this traffic growth. Transit services and pedestrian and cyclist safety will also be impacted by the City's growth. These modes of travel must also be addressed through improvement alternatives and opportunities that will provide a balanced approach to all modes.

1.4 References and Background Studies

Other studies reviewed or referenced are outlined below:

- City of Kawartha Lakes Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan (UEM, February 2012);
- City of Kawartha Lakes Growth Management Strategy (UEM, May 2011);
- City of Kawartha Lakes Shoreline Environmental Studies in Support of Official Plan Policies Report, (Gartner Lee, August 2002);
- City of Kawartha Lakes and Kawartha Region Conservation Authority, Sturgeon Lake Management Plan – Watersheds of Sturgeon Lake (2010);

- Kawartha Region Conservation Authority Final Draft Sturgeon Lake Management Plan (2014);
- Heritage Buildings - City of Kawartha Lakes (July 2007);
- City of Kawartha Lakes Heritage Master Plan (Richard Fortin Associates, January 2012);
- Proposed Commercial Developments – 449 Kent Street, Lindsay, City of Kawartha Lakes – Traffic Impact Study (Tranplan Associates, February 2013);
- Addendum Report to the Traffic Impact Study for the Commercial Development on Kent Street, Lindsay, City of Kawartha Lakes (Tranplan Associates, May 6, 2013);
- City of Kawartha Lakes (Lindsay) Walmart Transportation Study (HDR, July 2013);
- Chadwin Drive Mixed Use Development Blocks 13 and 16 – Old Lindsay Fairgrounds, City of Kawartha Lakes – Traffic Impact Study Final Report (Tranplan Associates, September 2012);
- Highlands Subdivision Traffic Impact Study – Angeline Street & Kent Street, City of Kawartha Lakes, Ont. (Tranplan Associates, November 2004);
- Proposed Mason Commercial Development – City of Kawartha Lakes (Lindsay) – Traffic Impact Study (Cole Engineering, May 31, 2007);
- City of Kawartha Lakes Aggregate Haul Route Study – Final Report (TSH, June 2006);
- The Corporation of the City of Kawartha Lakes Report – North West Sanitary Sewer Background Study (May 29, 2012);
- The Corporation of The County Of Victoria Transportation and Public Works Department – Scugog River Crossing Class Environmental Assessment ESR (totten sims hubicki associates, January 1994);
- County of Victoria – Scugog River Crossing Phase 2 – Colborne Street Bridge – Addendum to the 1994 ESR (Cole, Sherman & Associates, 2000);
- Noise Impact Study – Scugog River Crossing, Preliminary Design – Colborne Street West to Colborne Street East, Town of Lindsay, County of Victoria, Ontario (SS Wilson Associates, May 22, 2002);
- The Greenbelt Plan (Ontario Ministry of Municipal Affairs and Housing, 2005);
- Oak Ridges Moraine Conservation Plan (Ontario Ministry of Municipal Affairs and Housing, 2001);
- Growth Plan for the Greater Golden Horseshoe (Ontario Ministry of Infrastructure, 2006);
- City of Kawartha Lakes Official Plan (2010);

- City of Kawartha Lakes Trails Master Plan (ENVision – the Hough Group, March 2006);
- Sturgeon Lake Management Plan – Watersheds of Sturgeon Lake (Kawartha Region Conservation Authority, 2010); and
- Shoreline Environmental Studies in Support of Official Plan Policies (Gartner Lee Limited, August 2002).
- City of Kawartha Lakes Streetscape and Façade Design Guidelines

1.5 Provincial Planning Context

The provincial plans and policies considered as part of the land-use planning objectives review for the study are discussed below.

1.5.1 Greenbelt Plan

The study corridor falls within the designation of a “Settlement Area outside the Greenbelt” in the ***Greenbelt Plan***, 2005.

1.5.2 Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine Conservation Plan (ORMCP), 2001, provides land use and resource management planning direction to provincial ministries, agencies, municipalities, municipal planning authorities, landowners and other stakeholders, on how to protect the Moraine’s ecological and hydrological features and functions.

The study corridor does not fall within the boundaries of the ORMCP.

1.5.3 Provincial Policy Statement

The ***Provincial Policy Statement*** issued under Section 3 of the Planning Act came into effect as of March 1, 2005.

The Provincial Policy Statement focuses growth within settlement areas and away from significant or sensitive resources and areas which may pose a risk to public health and safety and vice versa. It recognizes that the wise management of development may involve directing, promoting or sustaining growth. Land uses must be carefully managed to accommodate appropriate development to meet the full range of current and future needs, while achieving efficient development patterns.

1.5.4 Places to Grow Act / Growth Plan for the Greater Golden Horseshoe

The Provincial ***Places to Grow Act,*** 2005 and the associated regional ***Growth Plan for the Greater Golden Horseshoe,*** 2006 is a framework for implementing the Government of Ontario’s vision for building stronger, prosperous communities by

better managing growth to 2031. The Plan will guide decisions on a wide range of issues in the interest of promoting economic prosperity.

The vision for the Greater Golden Horseshoe (GGH) is grounded in the following principles that provide the basis for guiding decisions on how land is developed, resources are managed, and public dollars invested:

- Build compact, vibrant and complete communities.
- Plan and manage growth to support a strong and competitive economy.
- Project, conserve, enhance and wisely use the valuable resources of land, air and water for current and future generations.
- Optimize the use of existing and new infrastructure to support growth in a compact, efficient form.
- Provide for different approaches to managing growth that recognize the diversity of communities in the GGH.
- Promote collaboration among all sectors – government, private and non-profit, and residences to achieve the vision.

1.6 Municipal Planning Policies

Planning policies and related studies were reviewed to develop an understanding of the City's vision. The applicability of the subsequent documents, as they relate specifically to the study corridor, is discussed in later sections of this report.

1.6.1 Official Plan

The Official Plan (2012) is currently under appeal. However, the basis upon which the guiding principles were developed are separated into the following five categories:

1. Environment;
2. Economy;
3. Housing;
4. Strategic Planning Exercise (Community Vision); and,
5. Health and Sustainability.

<u>Environment</u>

- The Official Plan states that the City is blessed with a number of natural features that are considered irreplaceable assets, and these features must be protected.
- Furthermore, that the environment is the basis upon which all planning takes place and measures will be taken to protect the water quality and quantity of the surface and groundwater resource.

Economy

- Generally, manufacturing and agriculture comprise two of the largest sectors in the local economy by gross sales. Tourism, retail, and commercial uses continue as steady and healthy contributors to the economy. The City must plan on the basis of the Provincial Growth Plan projections which currently target 27,000 new jobs by 2031.
- The tourism industry represents a significant component of the City's economy. In Kawartha Lakes, there is potential for increased growth in this sector, particularly in the following areas: eco-nature tourism, education and learning vacations, sustainable development, resource conservation and healthy lifestyle activities. Increasing the number of recreational opportunities should also be explored as a method of increasing tourism.
- Access to serviced industrial lands is available throughout the City. The Lindsay Industrial Park offers serviced industrial lots ranging from 0.4 ha to 402.43 ha. In addition to municipally owned industrial land, many private and publicly owned industrial building sites exist, including an industrial subdivision in Pontypool located within minutes of Highways 115 and 35.

Housing

- The predominant form of housing within the City is single detached dwellings. Within the urban centres, multiple residential developments in the form of apartments and townhouses are available. There is a need for additional housing for lower income families, seniors and those with special needs. Housing will be encouraged in existing settlement areas; however, care needs to be given with respect to location, density, servicing and impact on surrounding land uses.
- The City will encourage the provision of a broad mix and range of housing to meet the needs of present and future households in the area. The City also encourages the provision of housing types, densities and tenures that are affordable to moderate and lower income households. The City encourages residential intensification in the built up area and establishing cost effective development standards for new residential development and redevelopment.

Strategic Planning Exercise (Community Vision)

- A Community Profile was completed which provided a summary of Community Values and a list of key initiatives which form the basis of the Community Vision.
- "The Vision for the City of Kawartha Lakes recognizes the City as a community of vibrant communities. The Vision emphasizes the City's dedication to good government, responsible planning and growth management. Attention will be given to special population groups, including seniors, youth and persons with special needs. As a green community, value will be placed on conservation of the area's natural environment. Economic

prosperity will be realized, with well-established sectors such as tourism and agriculture growing further as important contributors to the local economy."

Health and Sustainability

- The City of Kawartha Lakes is attractive to many, with its natural beauty, rich heritage and natural resources. The Official Plan manages lands and resources and directs future growth to ensure that community needs and desires are met for today and into the future.
- The City of Kawartha Lakes will strive to balance the community's economic, environmental and social objectives through, among other things, policies and directions in the Official Plan that encourage sustainable community development and active and healthy living for residents, businesses and visitors to enjoy.
- The Official Plan reflects a determination by City Council to establish a safe, healthy and active community while achieving a high quality of life for citizens of all ages. The City is committed to partnering and collaborating with community and government stakeholders to achieve this goal.
- The Official Plan contains policies to encourage and promote active transportation and connectivity for pedestrians and all modes of transportation.

1.6.2 City of Kawartha Transportation Master Plan

The City's Transportation Master Plan was developed to assist the City in preparing a comprehensive transportation plan to support the City's goals to maintain a high quality of life in the future, and provide for economic development throughout the City's rural and urban areas. It was developed through the identification of policies, guidelines, improvement recommendations and an implementation plan, to accommodate growth in a healthy and sustainable way.

The key Transportation Strategy recommendations from the TMP are:

- Adopt a balanced strategy of providing both structural improvement and non-structural improvements to address future capacity deficiencies. This will include road widenings to corridors identified in Appendix G of the TMP. This will also include the planning for additional traffic capacity across the City by:
  - providing improved transit services to new development areas in Lindsay, and between Lindsay and other settlement areas;
  - planning sidewalk and cyclist facilities to new roads and widened roads to encourage use of active transportation modes;
  - providing improved signage of cycling routes;
  - updating promotional materials describing the walking and cycling facilities available in the City;

  - considering implementation of 'Share-the-Road' signing of cycling routes and 'Active and Safe Route to School' walking programs at local schools;
  - encouraging preparation of Transportation Demand Management (TDM) plans, including programs for cyclists, by considering bonuses under the Planning Act or other incentives including reduced parking requirements; and,
  - undertaking a comprehensive Transportation System Management (TSM) program.
- Implement the recommendations of the Trails Master Plan in conjunction with the recommendations of the TMP plan. Specifically, that a cycling network study be initiated to identify and review the cycling, pedestrian and trails connectivity and improvement priorities.
- Undertake a Parking Strategy Study to assess the operation of existing downtown parking in Lindsay and other settlement areas, the costs of providing this parking (operations and maintenance), the parking requirements for new development and redevelopment sites in the downtown areas, the method of parking enforcement and the potential to provide additional parking to meet future demands.

1.6.3 City of Kawartha Growth Management Strategy

The Growth Management Strategy is part of the City's Municipal Master Plan Project. The purpose of the City of Kawartha Lakes Growth Management Strategy is to develop a strategy to plan for and manage growth in a sustainable manner that addresses economic, social and environmental considerations. The goal of the City of Kawartha Lakes Growth Management Strategy is to prepare an overall comprehensive growth management plan.

- The majority of the growth in the City will be in the four urban settlement areas, including Lindsay.
- Out of the four settlement areas, Lindsay has the highest estimated growth potential (in number of units as well as in population capacity).
- Higher density developments should be targeted for the Town of Lindsay.
- There is limited potential for office development and employment lands in any of the settlement areas, except for Lindsay.

1.6.4 City of Kawartha Trails Master Plan

The City's Trails Master Plan recognizes that there will be significant growth in the City, concentrated in Lindsay. Trails and paths are currently used by both non-motorized and motorized vehicles. The paths are also used year round and accommodated a variety of modes. There is also an expectation that since the population is comprised of a large proportion of those over the age of 65, interest in outdoor activities will become more important.

The Trails Master Plan seeks to link the various settlement areas within the City together, as well as providing loop trails serving each community. In Lindsay there are several trails surrounding the Town. No existing or proposed trails enter the study area; however, a proposed snowmobile / ATV bypass route uses Highway 35, along the western edge of the study area.

1.7 Class Environmental Assessment Process

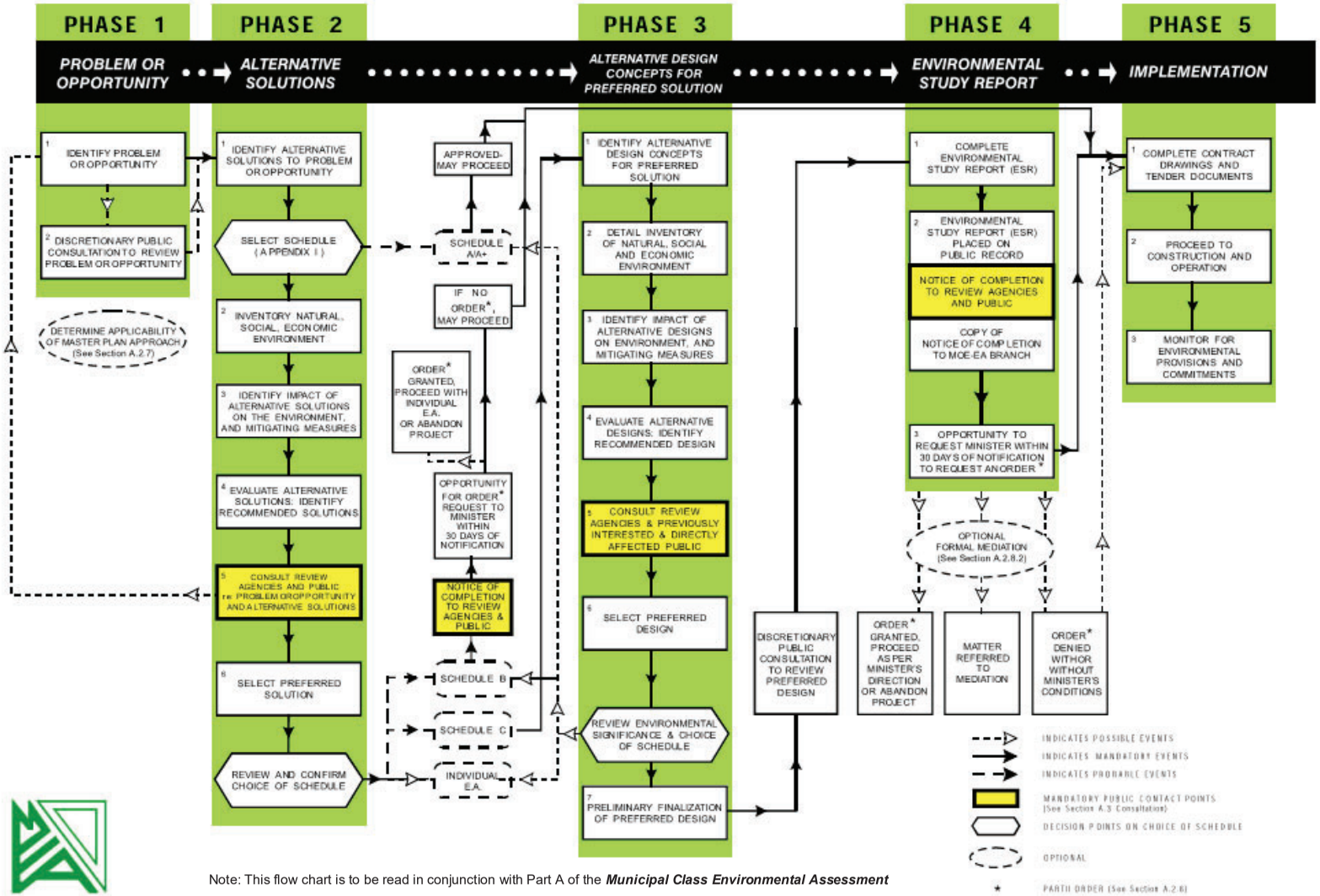
This Class EA and corridor (operational review) study was undertaken and prepared in accordance with the guidelines of the Municipal Engineers Association ***Municipal Class Environmental Assessment,*** October 2000 (amended in 2007, 2011 and 2015) and is being carried out as a Schedule "B" project, in accordance with the requirements of Class EA process. A ***Schedule 'B'*** project involves improvements and minor expansions to existing facilities. This could include minor road widening and operational improvements at intersections at a cost of less than $2.4 million. **Exhibit 1-2** illustrates the sequence of activities within the approved Class EA process leading to project implementation.

The phases for this study are described below:

- **Phase 1** – Identify the problem (deficiency) or opportunity.
- **Phase 2** – Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and review agency input. Document in a Project File Report (PFR) a summary of the rationale, and the planning design, and consultation process of the project.

Upon finalization of the PFR, it will be filed and placed on public record for a voluntarily-extended 45-calendar day review period to allow for additional review by the public and review agencies. This extended review period is longer than the 30-day minimum requirement under the ***Municipal Class Environmental Assessment***. At the time the report is filed, a Notice of Completion of the Project File Report is advertised to notify the public and other stakeholders where the Project File Report can be found and reviewed, and how to submit public comments.

For information on the issuance of the Notice of Completion and Part II Orders, please refer to **Section 8.7** of this report**.**



Note: This flow chart is to be read in conjunction with Part A of the ***Municipal Class Environmental Assessment***

Exhibit 1-2: Class Environmental Assessment Process

1.7.1 Canadian Environmental Assessment Act (CEAA)

Under the ***Canadian Environmental Assessment Act, 2012 (CEAA 2012)***, a federal environmental assessment study may be required to assess the environmental effects of the physical activities that constitute a "designated project", under the project list identified in the ***Regulations Amending the Regulations Designating Physical Activities, 2013***. This project list ensures that federal environmental assessments are focused on the major projects with the greatest potential for significant adverse environmental impacts on matters of federal jurisdiction.

The Colborne Street Schedule B Class EA and Corridor Study does not constitute a "designated project" and therefore does not require an environmental assessment under the CEAA 2012; however, the Minister of the Environment may order an assessment for any project not included in the project list, where there may be adverse environmental effects related to federal jurisdiction.

2 EXISTING STUDY AREA CONDITIONS

The following section documents existing conditions with respect to the socio-economic environment, cultural environment, natural environment, and infrastructure. These existing conditions provide the context and constraints to potential solutions for the Colborne Street corridor. The existing and future transportation conditions in the study area, which is the focus of the corridor study, are discussed in later sections of the report.

2.1 Socio-Economic Environment

2.1.1 Existing Land Use and Access

The Colborne Street corridor is predominately residential, with single family detached homes fronting along both sides Colborne Street between William Street and Charles Street. Besides the single family homes, there are a few other notable land uses:

- Heritage Gardens Retirement Residence (at Heritage Way);
- Heritage Christian School (at Walker Street);
- Fairview Baptist Church (at Angeline Street);
- Colborne Lodge Senior Apartments (at Angeline Street);
- Briarwood Apartments (between Angeline Street and Adelaide Street);
- Brentwood Apartments (at Adelaide Street);
- Alexandra School (at Sussex Street); and
- City of Kawartha Lakes Town Hall (at Cambridge Street).
- Wilson Fields recreation area

West of Charles Street and on the north side of Colborne Street is currently undeveloped vacant lands which are expected to be developed into a residential subdivision, along with a commercial-retail node. On the south side of Colborne Street opposite this future subdivision is Wilson Fields sports facility. Between Wilson Fields and Charles Street, the land on the south side of Colborne is currently vacant.

Most residences along Colborne Street have private driveways. Although there are many closely spaced driveways, they are low traffic generators; therefore, the high number of access points long Colborne Street is not currently causing any operational or safety concerns.

2.2 Cultural Heritage and Archaeology

Cultural Heritage

A desktop review of existing built heritage and cultural resources was conducted based on available information provided by the City of Kawartha Lakes.

The Town of Lindsay, as well as the surrounding area, has a rich history dating back thousands of years; however, most built heritage was established in the 19th century and onwards. The Kawartha Lakes website states that:

> *"The Kawartha Lakes Heritage Victoria is a volunteer committee appointed by Council to assist and provide guidance on community heritage matters. In particular, Heritage Victoria will review and establish criteria, and recommend candidate sites of historic value and interest for designation under the Ontario Heritage Act. Historic Designation is a method of recognizing, preserving and celebrating the heritage of our community through the protection of historically significant sites, buildings and structures."*

The Heritage Victoria committee, through their publication ***Heritage Buildings - City of Kawartha Lakes*** (July 2007) has identified 35 buildings within the Town of Lindsay that are of historic significance; however, a review of the Canadian Register of Canada's Historic Places undertaken in November 2013 did not yield any results within the Town of Lindsay. The Canadian Register only includes locations which are formally recognized under the *Ontario Heritage Act*. None of the buildings identified by the Heritage Victoria committee as having historic significance are situated adjacent to the Colborne Street study corridor. This study does not anticipate impacting heritage assets.

Archaeology

The proposed project and activities for the Colborne Street corridor are anticipated to occur within the existing road right-of-way with the exception of the area in the vicinity of Angeline Street where additional property will be required due to the existing available right-of-way, and recommended improvements at the intersection of Colborne Street and Angeline Street. Given that these areas have been extensively disturbed by previous construction and utility installation activities, there is minimal potential for encountering archaeological resources in the study area.

Should an archaeology assessment be required, it will be completed during detailed design. .

2.3 Natural Environment

A desktop review of the existing natural heritage environment was undertaken based on previous studies and available literature.

The Scugog River runs north-south through the Town of Lindsay; however, it is located beyond the easterly limits of the study area.

According to the City of Kawartha Lakes and Kawartha Region Conservation Authority ***Sturgeon Lake Management Plan – Watersheds of Sturgeon Lake, 2010*** the study corridor falls within a "built-up area" of the Jennings Creek and Scugog River sub-watersheds. This mapping also indicates that no provincially significant wetlands fall within or adjacent to the study corridor. Refer to **Exhibit 2-1.**

In addition, the Kawartha Region Conservation Authority's ***Jennings Creek Sub-watershed Map,*** and the ***Scugog River Sub-watershed Map,*** indicates that the study area is designated in lands demarcated as "built-up area." As well no MNR Wetlands are shown within the limits of the study corridor. Refer to **Exhibit 2-2 and Exhibit 2-3**.

An excerpt from ***Figure 2: Shoreline Environmental Features - Summary for the City of Kawartha Lakes*** from the ***Shoreline Environmental Studies in Support of Official Plan Policies Report, August 2002, Gartner Lee*** is provided in **Exhibit** 2-4. According to this figure no Areas of Natural and Scientific Interest (ANSI), Evaluated Wetlands, or other environmental features are identified within or adjacent to the study corridor. A "cartographic" wetland (i.e. an area identified as wetland from the interpretation of aerial photography based on the presence of visual indicators such as wetland vegetation, organic soils and high water table conditions) is shown in ***Figure 2*** west of the Highway 35 and Colborne intersection; however, it is noted that according to the Kawartha Region Conservation Authority ***Wetlands Map, 2013, Jennings Creek Sub-watershed Map,*** and the ***Scugog River Sub-watershed Map,*** no wetlands or MNR Wetlands are shown within the limits of the study corridor.

Figure 1.13 from the Kawartha Region Conservation Authority ***Final Draft Sturgeon Lake Management Plan, 2014*** indicates meadow natural cover exists southeast of the Highway 35 and Colborne Street intersection and southeast of the Angeline and Colborne Street intersection. Refer to **Exhibit 2-4.**

Exhibit 2-5 and **Exhibit 2-6** respectively provide reference to the bedrock geology and the quarternary geology for the study corridor. The bedrock geology is classified as 51 Limestone, dolostone, shale, arkose, sandstone and 51a Ottawa Group; Simcoe Group; Shadow Lake Formation. The quaternary geology of the study corridor is classified as 19: Till and 24: Glaciolacustrine deposits.

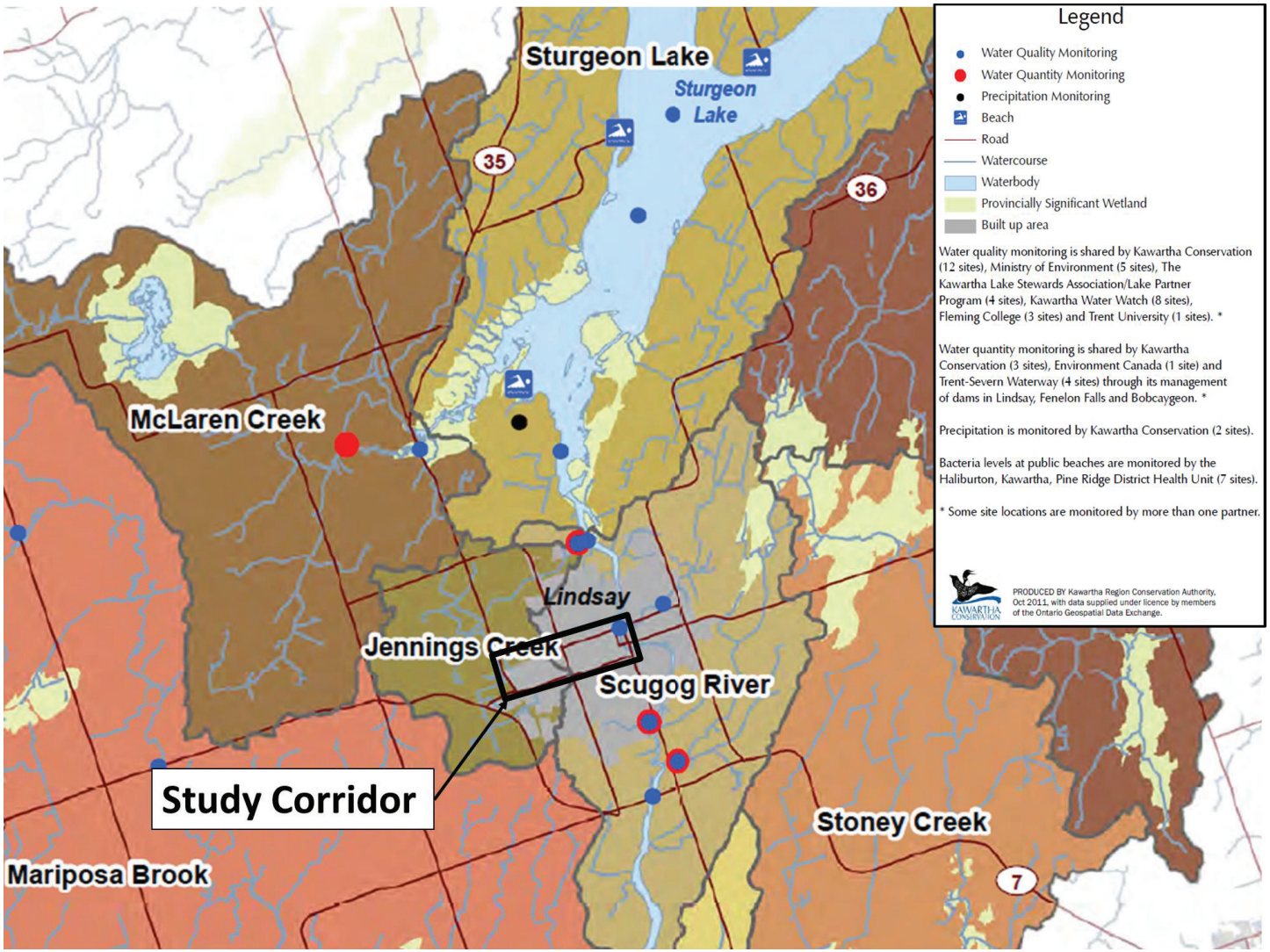


Exhibit 2-1: Watershed Boundaries *(Excerpt from Sturgeon Lake Management Plan - Watersheds of Sturgeon Lake, 2010)*

Exhibit 2-2: Sub-Watershed Mapping (Excerpt from Kawartha Region Conservation Authority Jennings Creek and Scugog River Watershed Maps)

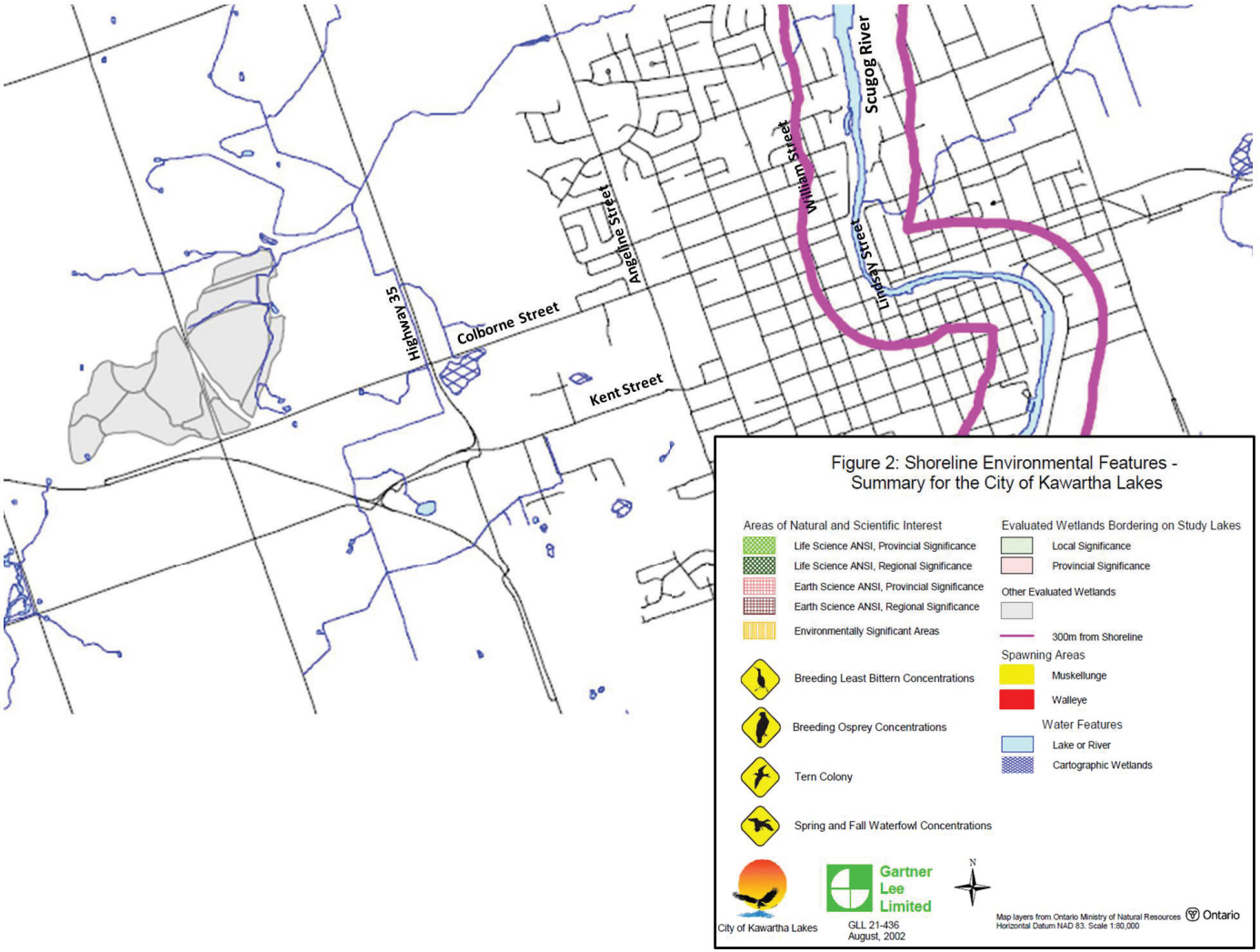


Exhibit 2-3: Environmental Features *(Excerpt from Figure 2 of Shoreline Environmental Studies Report, 2002)*

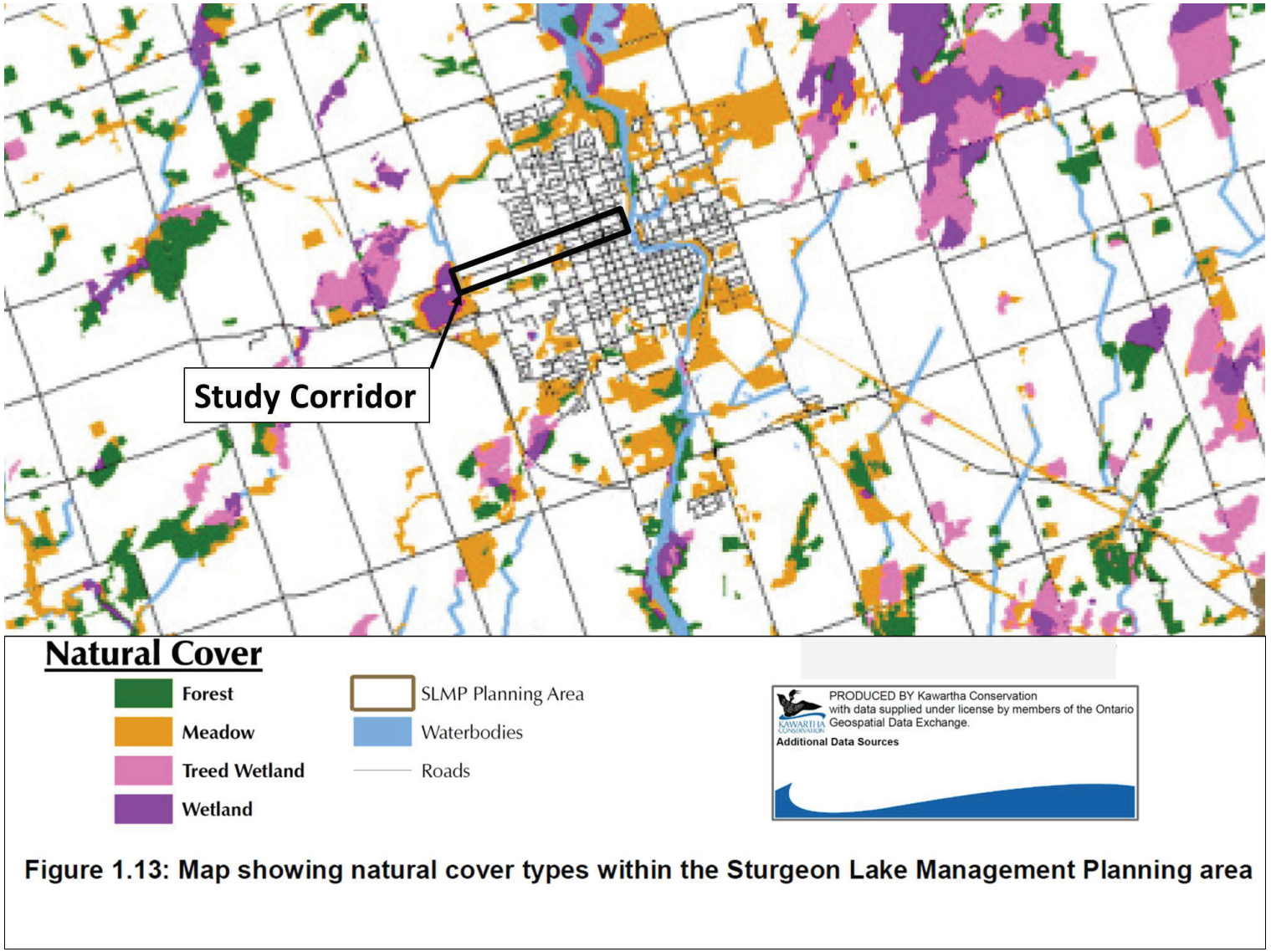


Figure 1.13: Map showing natural cover types within the Sturgeon Lake Management Planning area

Exhibit 2-4: Natural Cover ***(Excerpt from Figure 1.13 of Sturgeon Lake Management Plan, 2014)***

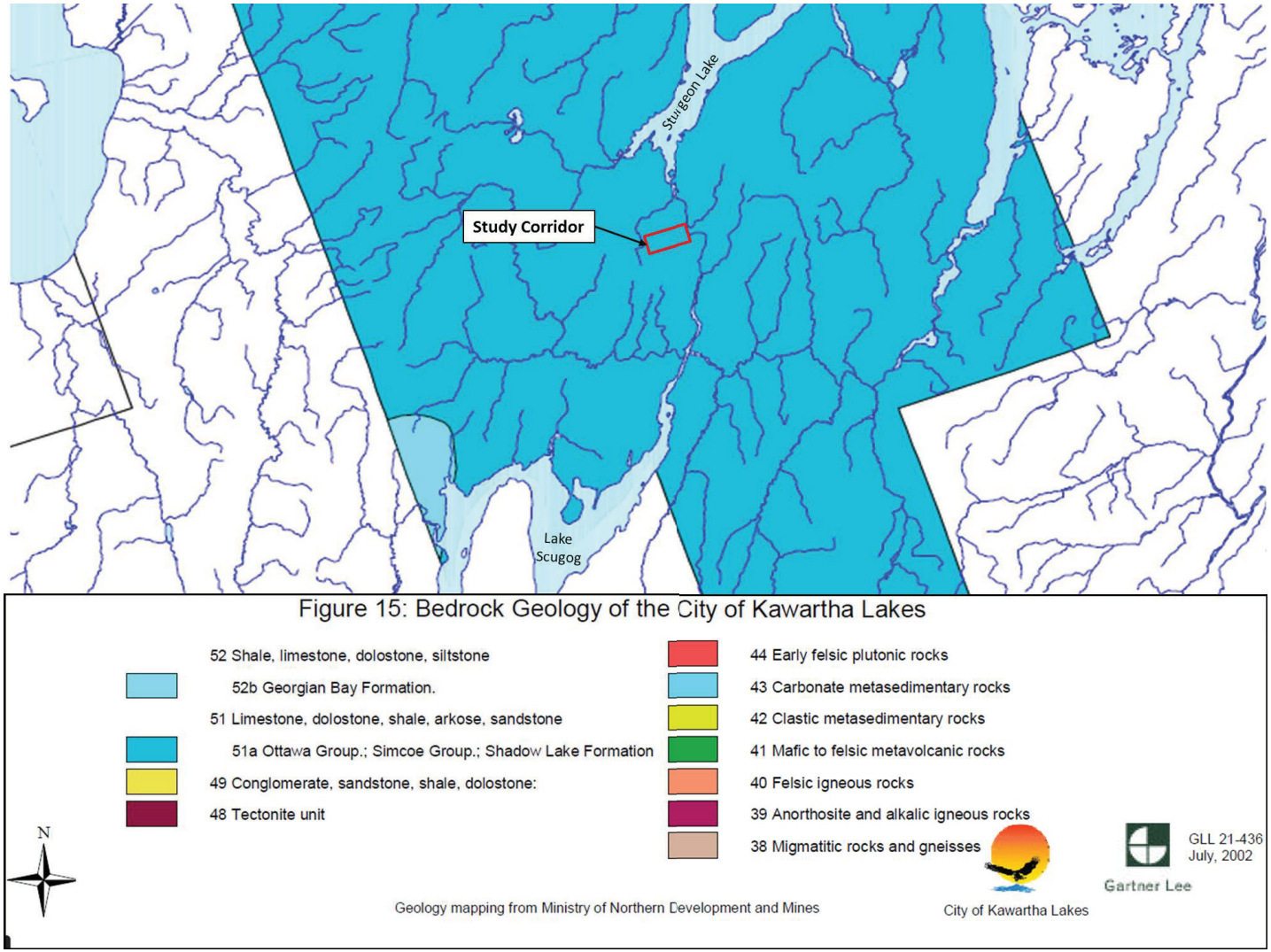


Exhibit 2-5: Bedrock Geology *(Excerpt from Figure 15 of Shoreline Environmental Studies Report, 2002)*

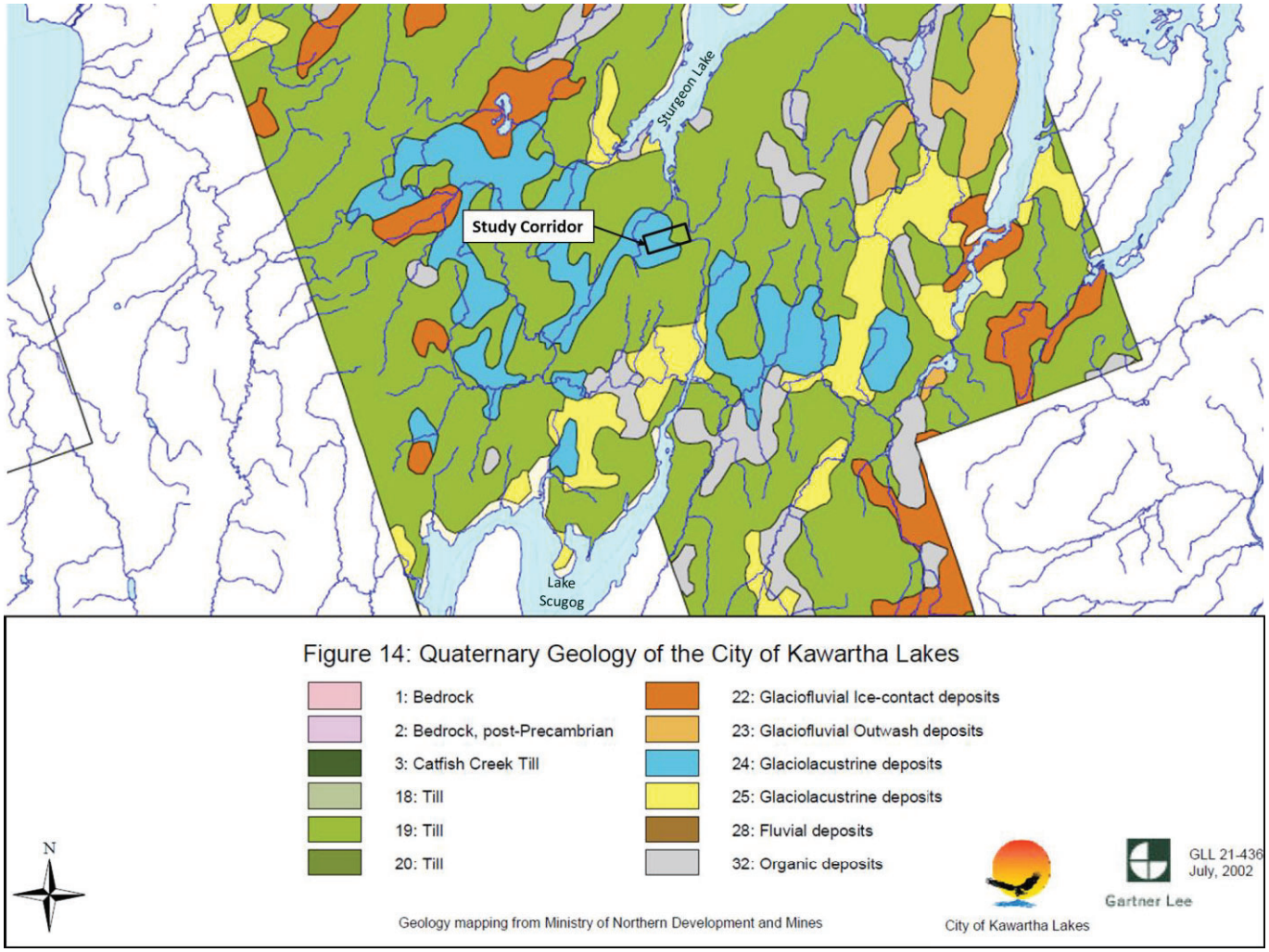


Exhibit 2-6: Quaternary Geology *(Excerpt from Figure 14 of Shoreline Environmental Studies Report, 2002)*

2.4 Existing Infrastructure

A detailed inventory and assessment of drainage/hydrology and geotechnical conditions, and utilities will be carried out during detailed design as necessary and if the proposed solutions could result in potential effects.

3 EXISTING TRANSPORTATION CONDITIONS

A detailed review of existing 2013 traffic conditions for Colborne Street was undertaken to confirm existing operations, capacity deficiencies, and safety issues experienced by the public traveling along the study corridor. The operational deficiencies and constraints identified at this stage provided input to the needs assessment and problem statement and were fundamental to the process of defining alternative solutions.

A field investigation was undertaken and included a detailed inventory of the road network including lane configuration, signage, and pavement markings. Traffic operations from a capacity and safety perspective were also observed using a design hour based on the weekday PM peak period.

3.1 Existing Cross-Section

Colborne Street has a varied right-of-way and varied cross-section throughout the corridor. The right-of-way varies from 26 m in the west end to 20-23 m in the central and east sections and 16 m for a short portion of Colborne immediately west of Angeline Street.

A summary of key characteristics of the existing cross-section, including the existing right-of-way, lane configurations and lane widths, is provided as follows:

Colborne West of St. Joseph Road

- 26.0 m right-of-way (typ.)
- 3.5 m (eastbound) and 4.0 m (westbound) general purpose travel lanes, one in each direction
- 1.2 m sidewalk, on south side, extending midway to Highway 35 from St. Joseph Road
- 2.5 m parking lane, on south side

Colborne East of St. Joseph Road

- 26.0 m right-of-way (typ.)
- 6.0 m (eastbound) and 4.0 m (westbound) general purpose travel lanes, one in each direction
- 1.2 m sidewalk, on south side
- No parking

Colborne West of Angeline Street

- 16.0 m right-of-way (typ.)
- 3.2 m (eastbound) and 3.8 m (westbound) general purpose travel lanes, one in each direction
- 2.8 m eastbound left-turn lane

	▪ 1.2 m sidewalk, on south side ▪ No parking
Colborne East of Angeline Street	▪ 23.0 m right-of-way (typ.) ▪ 4.0 m (eastbound) and 5.8 m (westbound) general purpose travel lanes, one in each direction ▪ 2.6 m sidewalk on south side, 1.8 m sidewalk on north side ▪ No parking
Colborne East of Victoria Avenue, at City Hall	▪ 20.0 m right-of-way (typ.) ▪ 4.0 m (eastbound) and 3.3 m (westbound) general purpose travel lanes, one in each direction ▪ 2.0 m sidewalk, on north side ▪ 2.4 m parking lane, on north side
Colborne East of Victoria Avenue, East of City Hall	▪ 20.0 m right-of-way (typ.) ▪ 4.0 m (eastbound) and 3.3 m (westbound) general purpose travel lanes, one in each direction ▪ 2.4 m sidewalk on north side, 1.2 m sidewalk on south side ▪ 2.4 m parking lane, on north side

The variation of the existing right-of-way throughout the corridor is shown in **Exhibit** 3-1.

3.2 Active Transportation

3.2.1 Pedestrian and Cyclist Facilities

The Lindsay Area Trails Master Plan, as taken directly from the ***Trails Master Plan for the City of Kawartha Lakes*** shows there are currently no trails internal to the study area. There are currently no dedicated cycling routes within the Town.

Pedestrian and bicycle volumes are relatively consistent throughout the corridor. Sidewalks are not continuous along the entire length of the corridor, as shown in **Exhibit 3-2**. Bicycles currently use the sidewalks or the road. Existing 2013 bicycle and pedestrian volumes are shown in **Exhibit 3-3**.

Beginning from the west end of the corridor, no sidewalk is provided on the **south side** of Colborne Street until midway to St. Joseph Road. A sidewalk is then provided on the south side of the road continuously until Victoria Avenue, at which

point there is a one block segment along the frontage of City Hall, where no sidewalk is provided. Sidewalk is then provided along the remainder of the south side from Cambridge Street until William Street. West of Angeline Street the sidewalk on the south side is separated from the roadway by landscaped grass boulevard. An asphalt splash-pad is provided between Angeline Street and Adelaide Street, and from Cambridge Street to William Street. In other sections, the south side sidewalk is directly adjacent to the curb and gutter.

Exhibit 3-1: Existing Right-of-Way

Exhibit 3-2: Existing Active Transportation Facilities (Sidewalks)

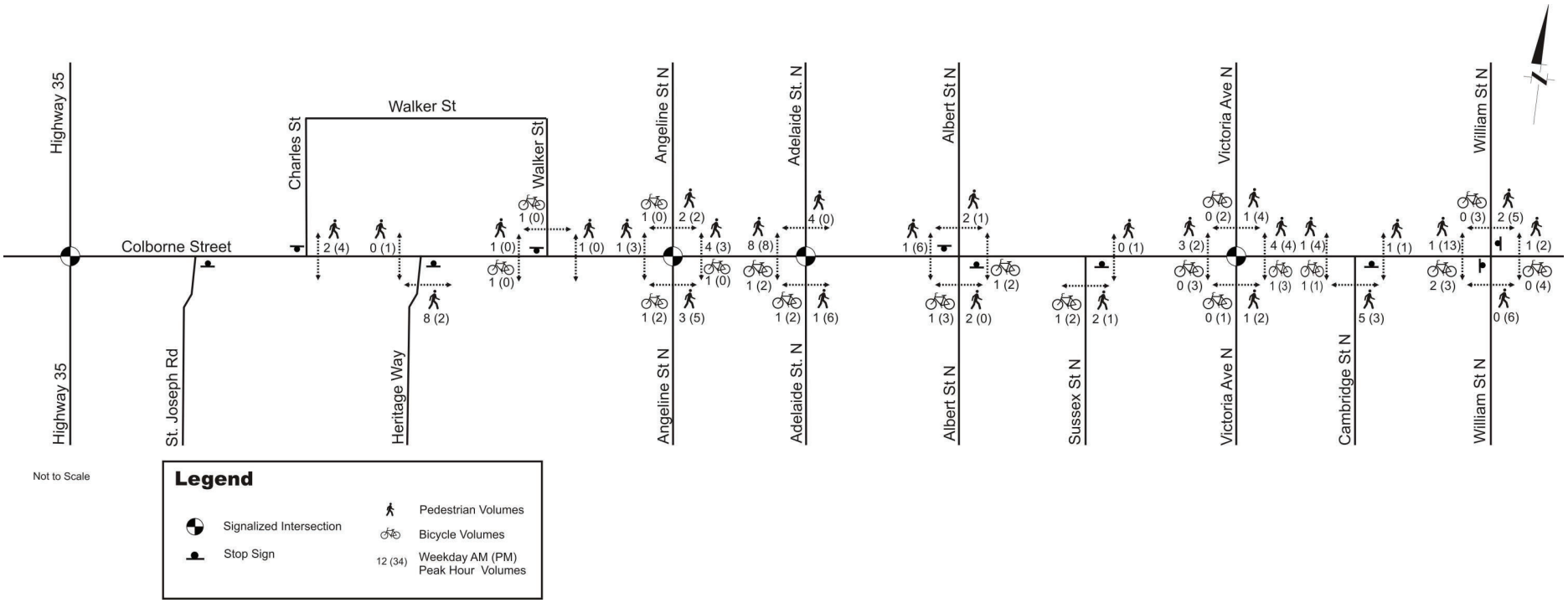


Exhibit 3-3: Existing Bicycle and Pedestrian Volumes (during AM and PM traffic peak hours generally between 8:00 and 9:00 AM and 4:30 and 5:30 PM, respectively)

Beginning from the west end of the corridor, on the **north side** of Colborne Street, no sidewalks are provided until Angeline Street. A sidewalk is then provided on the north side of the road continuously until the easterly limit of the corridor, at William Street. The sidewalk on the north side of the roadway is directly adjacent to the curb and gutter (no splash-pads or boulevards are present).

Sidewalk widths vary between 1.2 m and 2.6 m, but the average is closer to 1.2 m.

Based on discussions with residents and City staff, there is a higher number of pedestrians crossing in the vicinity of Alexandra School near Sussex Street (younger children) and Albert Street (youth). On the west leg of Sussex Street there is a pedestrian crosswalk which is supervised by a crossing guard when school is in session. Existing signage on Colborne warns drivers that the crossing is approaching. At the time of the inventory the signage on approach to the crossing for the eastbound approach consisted of 3 signs, while 2 signs were used for the westbound approach. A sign posted after the crosswalk also warned drivers that the crossing area has ended for westbound traffic. The main concerns raised by the public and identified by the City is the provision of safe crossing locations in this area particular when traffic will increase in the future. Signage related to the Sussex Street crossing is shown in **Exhibit 3-4**.

Warning Sign 1
(Both Approaches)

Non-standard Warning Sign 2
(Eastbound Approach Only)

Crosswalk Sign
(Both Approaches)

Crossing Area Ends
(Westbound Direction Only)

Exhibit 3-4: Sussex Street Crosswalk Signage

3.2.2 Transit Service

Currently there are three routes serving Lindsay; however, none of the bus routes serve the entire length of Colborne. The service map is shown below in **Exhibit 3-5**. The Green route passes Colborne in a north-south direction on William, Victoria, Adelaide, and Angeline Streets; while the Blue route services Colborne between St. Highway 35 and Adelaide Street. Service is generally provided Monday to Saturday between 7:00am and 7:00pm with headways of one hour (not including overlapping

route schedules). There is no Sunday service. The two routes serving the Colborne corridor connect to Lindsay Square in the west commercial section of Kent Street and a transit hub on William Street immediately south of Kent Street.

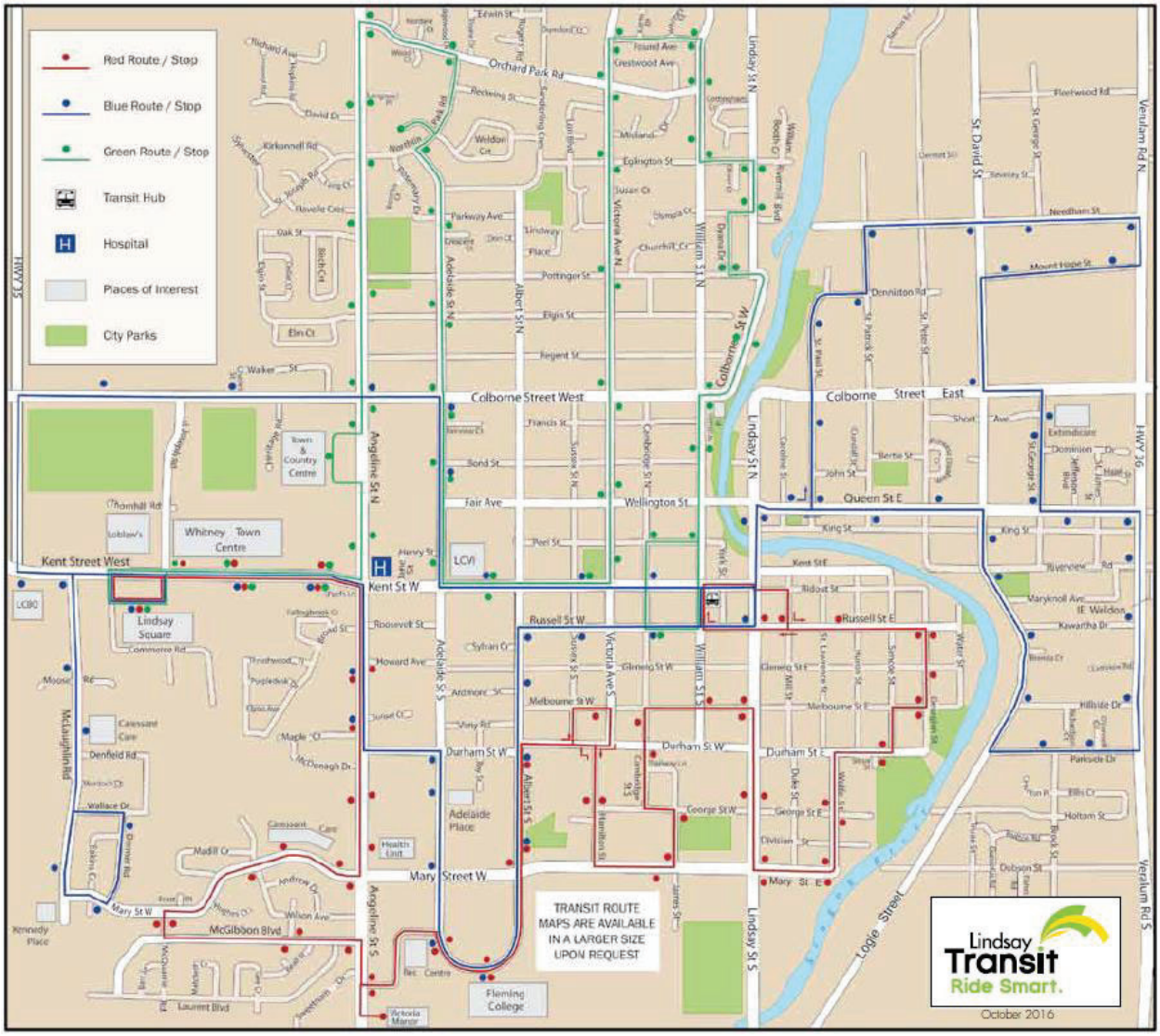


Exhibit 3-5: Existing Transit Network

3.3 Parking

West of Angeline Street along Colborne Street there are no posted parking restrictions. A parking lane is provided on the south side of Colborne Street, west of St. Joseph Road, which extends midway to Highway 35 along the frontage of Wilson Fields Park.

East of Angeline Street, parking is not permitted on the south side of the road for the entire corridor, or on the north side between Angeline Street and Adelaide Street. A

parking lane is provided on the north side of Colborne Street east of Adelaide Street extending to the east end at William Street.

Residents feel that the on-street parking located on Colborne Street is highly utilized in the vicinity of City Hall (Cambridge Street and Victoria Avenue). Many state that at times there is no room for them to park on street, especially when City Hall is holding events or meetings. With the on-site parking supply at capacity, the surrounding local road network is the only other option for parking. Residents have suggested that City Hall's on-site parking supply is insufficient and does not accommodate the employee demand, forcing employees to utilize the on-street parking supply for extended periods of time. Given the choice of maintaining the on-street parking or using this space for additional travel or turning lanes, residents have noted that they feel the parking provided along Colborne Street must remain.

3.4 Traffic Operations

Existing traffic operations were assessed based on traffic counts undertaken on Wednesday August 14th, 2013. A Synchro traffic model was developed to assess operations of the road network based on the counts. The model included adjustments for parking lanes, and utilized the signal timing plans provided by the City. Only the weekday PM peak hour has been assessed since hourly counts over the day show a constant increase of traffic volumes throughout the day. This was consistent with field observations. Weekday AM peak or mid-day peak periods were not assessed for this reason.

Under existing conditions, study intersections are operating well based on industry criteria for delay and level of service (see **Appendix A** for level of service definitions). The intersection of Colborne Street and Angeline Street is the only intersection with overall level of service 'C' during the PM peak hour. Otherwise all intersections are operating with overall level of service 'B' or better. Some movements at unsignalized intersections along Colborne Street will operate with level of service 'C'. One exception is the westbound left-through-right movement at the intersection of Colborne Street and William Street, which is operating with level of service 'F' during the weekday PM peak hour. There is excess capacity at all study intersections along the Colborne Street corridor.

Operations are similar to those summarized in the ***Transportation Master Plan***, but have improved slightly in some instances due to decreases in traffic volumes compared to the counts shown in the ***Transportation Master Plan***. Currently there are no areas identified with capacity deficiencies.

More details on the existing conditions analysis are provided in **Appendix A**.

3.5 Pavement Markings and Signage

Pavement markings in the corridor are generally in good condition. Most of the corridor signage is generally correctly placed and in good condition. There are some instances where non-standard signs have been installed as of the time of our inventory (2013).

The condition of pavement markings on Colborne Street varied from good to fair. In most instances, pavement markings were well delineated and are in accordance with the **Ontario Traffic Manual (OTM)**. There are faded white pavement markings along Colborne Street near Adelaide Street**.** As there is no bike route along this corridor and this faded line could potentially confuse cyclists and drivers.

An inventory of regulatory and warning signs was carried out. The placement of the signs, their size, and condition were appropriate. The corridor was noted as having consistent regulatory and warning signs that are in conformance with the **OTM**.

Generally no issues were identified with respect to drivers' ability to detect, identify, and react to the signs at intersections. There were no signs that could potentially be considered unnecessary or confusing that should be removed. All signs were clearly visible well in advance for drivers to process their intended message. Spacing of the signs also assured that there were no locations where signs obscured each other.

Alexandra Public school is located in the southwest corner of Colborne Street and Sussex Street. School area and crossing warning signs are in accordance with the **OTM**. The visibility and clarity of school crossing signs are adequate except there was one school area sign located west of Sussex Street which has tabs that do not conform to the **OTM**.

More details on the existing pavement marking and signage conditions are provided in **Appendix A**.

3.6 Collision History

A high level collision analysis was undertaken to evaluate the overall safety performance of the corridor, and to identify collision-prone locations, collision-types, and frequency, and probable causes. The City provided HDR with collision history data from January 2004 to August 2012. Only the most recent five-year history was reviewed. Due to the format in which the data was presented, no accurate information was obtained on some key elements including severity, environment condition, time of day, and road surface condition. This is a brief summary of the findings:

- 127 reported collisions during the five-year study period.
- Five collisions involved pedestrians.

- On average the corridor experienced 25.4 collisions per year over the study period.
- The predominant impact types on the corridor are rear-end, angle, and turning movement collisions.
- The two collision prone intersections are:
  - Angeline Street (26 collisions) - the predominant impact type is rear end collisions. There was one pedestrian collision in the history reviewed.
  - Albert Street (17 collisions) - the predominant impact type is angle collisions. Two pedestrian collisions in the history reviewed were both caused by driver inattentiveness.

More details on the collision history review are provided in **Appendix A**.

4 FUTURE TRANSPORTATION CONDITIONS

This section documents the future conditions of the study corridor, including future traffic operations, and active transportation, transit, parking, and access management needs and opportunities.

4.1 Future Land Use

The general land uses previously described will be maintained into the future horizon year of 2031.

Approximately half of the future residential developments will be "intensification" of existing land uses. The remaining half is the development of "greenfield" properties already surrounded by residential land uses (according to the ***City of Kawartha Lakes Growth Management Strategy***). Furthermore, the commercial developments which are proposed are generally located near existing commercial or mixed-use areas. Thus, the overall land use structure of the Town is not anticipated to change; rather, new developments will result in intensification of existing land uses along each corridor, rather than conversion.

4.2 Future Transportation Network

4.2.1 Planned Future Network Improvements

To carry out the operational review it was assumed the same background network improvements as listed in the Transportation Master Plan **Section 1.1 Committed / Approved Network Improvements**. These improvements are also depicted in Figure 9-2 of the Transportation Master Plan as "future roads", shown in **Exhibit 4-1**. Additional "improvements by others" are depicted in Figure 9-4 of the Transportation Master Plan, shown in **Exhibit 4-2**. Only some of these improvements are within the vicinity of the study corridors and will have an impact on corridor operations.

In both of these figures, one future improvement for which a need is anticipated is an additional crossing of the Scugog River somewhere in the vicinity of Kent Street and Colborne Street. The figures depict the new crossing closer to the easterly limit of the Colborne Street corridor study area which is the location that was ultimately decided on through the Council decision as of September 22, 2015. The implications of a new crossing have been explored in later sections of this report, assuming the crossing is located at the easterly end of Colborne Street (see **Section 6.1.5**).

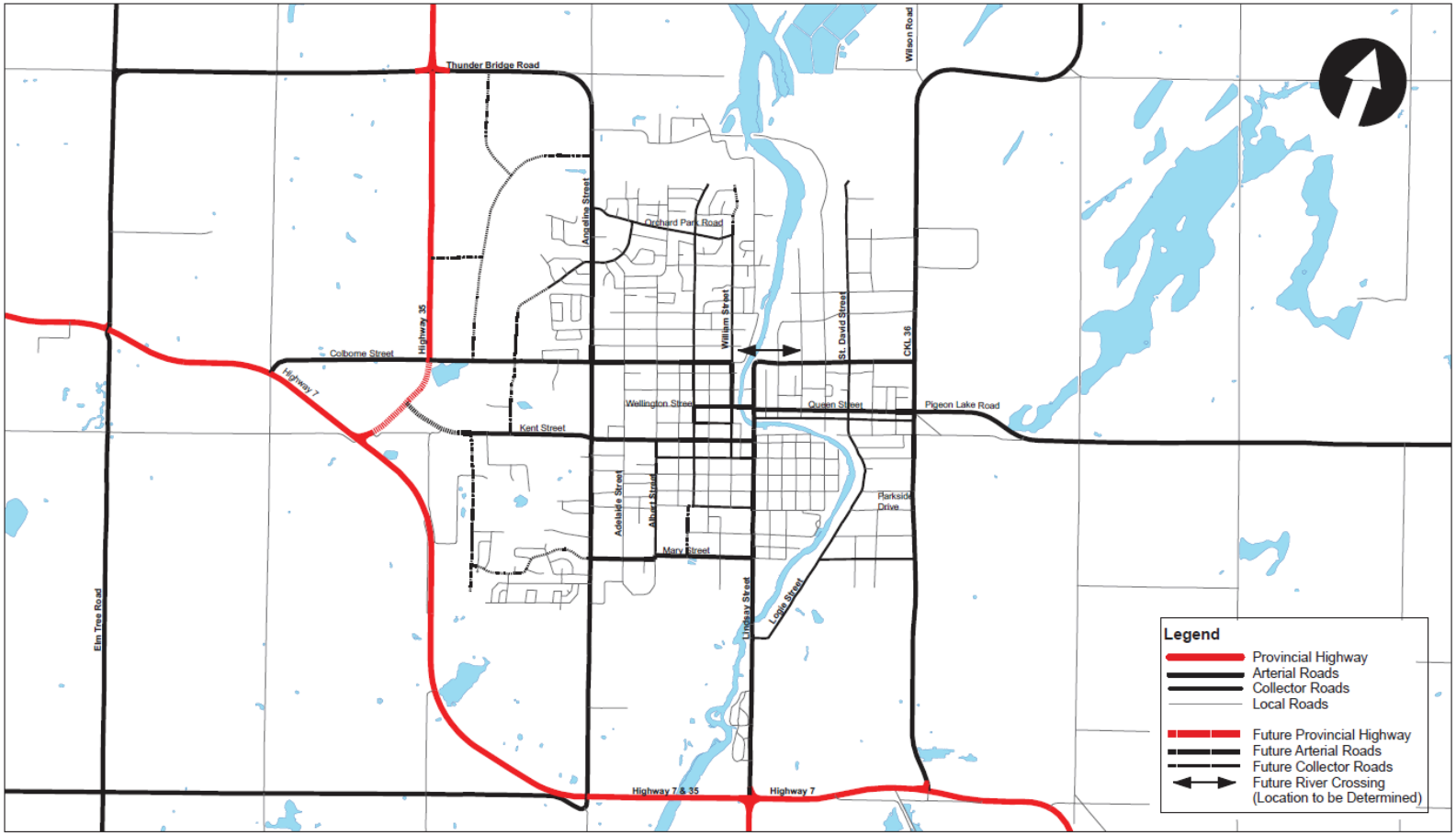


Figure 9-2
Proposed Lindsay Roadway Functional Classification

Exhibit 4-1: Transportation Master Plan Figure 9-2 (Proposed Lindsay Roadway Functional Classification)

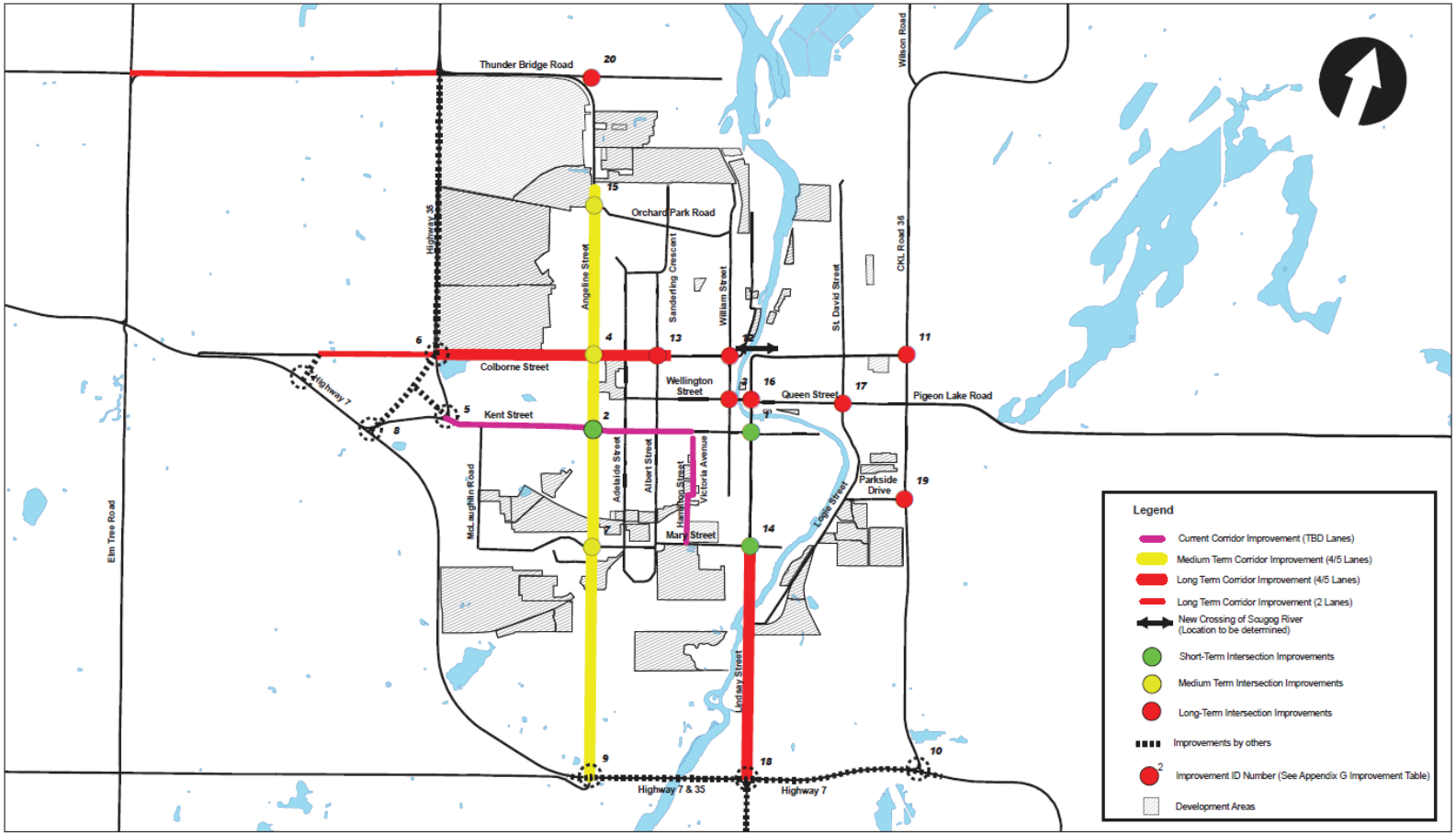


Figure 9-4
Proposed Improvement Plan - Lindsay

Exhibit 4-2: Transportation Master Plan Figure 9-4 (Proposed Improvement Plan - Lindsay)

4.2.1.1 Assumed 2031 Base Network Improvements for Colborne Street Corridor Operations Review

To carry out the operational review and assessment of future 2031 deficiencies, some of the above road network improvements (outside of the Colborne Street corridor) need to be assumed before undertaking the analysis. The selected improvements assumed for future 2031 analysis are:

1. Widening of Highway 35 from two to four lanes. This improvement is uncertain since timing and funding has not yet been secured; however, for this study it was assumed the widening will be undertaken prior to 2031.

2. Realignment of the Highway 7 and Highway 35 interchange (by MTO). The MTO already has a design for the realignment; however, the timing for this improvement is uncertain since funding has not yet been secured; however, for this study both the existing and the proposed realignments were considered.

3. The extension of St. Joseph Road to Angeline Street to the north (as a collector roadway).

4. Completion of Street A in the NW greenfield development area of Lindsay.

5. The extension and completion of local and collector roads, including McLaughlin Road, within the neighbourhood to the south of the Kent Street west commercial area.

6. Signalization of St. Joseph Road at Colborne Street was assumed since it is required to handle future volumes with the northerly extension.

7. Signalization of Colborne Street at William Street was assumed since it is deficient today and will be required to handle future volumes.

The Colborne Street operational review did not assume a new Scugog River bridge crossing since Council selected the crossing location after this study had commenced, and further determined that the trigger for a crossing will not be until the future crossing demand of 26,000 vehicles per day is reached, which is expected to occur around or after 2031; however, the implications of not constructing the bridge were assessed (in **Section 6** and **6.1.5**) based on 2031 traffic projections. The location for the new crossing is determined to be at the easterly end of Colborne Street, connecting to Colborne Street East on the east side of the Scugog River, as depicted in **Exhibit 4-1** and **Exhibit 4-2**, above.

4.3 Future Traffic Conditions

4.3.1 Traffic Projection Overview

Travel demand forecasts constitute the primary inputs for estimating future travel demand and assessing the alternative transportation solutions. Travel demand forecasts for 2031 had four components:

1. Future background traffic growth (1.0% per year) associated with development growth from outside the Town of Lindsay. Derived from a review of historic traffic volumes along Ministry of Transportation of Ontario highways in the vicinity, as well as a review of historic traffic volumes within Lindsay (where available). Growth was applied to existing traffic volumes.

2. Traffic growth associated with development within the Town of Lindsay based on the projected residential units provided by the Town through the ***City of Kawartha Lakes Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan (UEM, February 2012)***. For these developments, traffic volumes were projected based on the unit counts.

3. Traffic growth associated with development within the Town of Lindsay based on the proposed commercial developments for which traffic impact studies were available and provided by the Town. For these developments, traffic volumes were taken directly from the respective reports.

4. Traffic diversion associated with new roadways and links.

The commercial development forecasts were based on the following reports:

- Proposed Commercial Developments – 449 Kent Street;
- Walmart Transportation Study;
- Chadwin Drive Mixed Use Development Blocks 13 and 16 – Old Lindsay Fairgrounds;
- Highlands Subdivision Traffic Impact Study; and
- Proposed Mason Commercial Development – Kawartha Meadows.

In addition to traffic volumes included from the reports noted above, traffic volumes were also manually projected and assigned to the road network for the potential expansion of the Loblaws located in the north-west quadrant of the Kent Street and St. Joseph Street intersection. The expansion would add an additional 120,000 square feet of gross floor area.

4.3.1.1 Residential Development Trip Generation Methodology

To determine the magnitude of trips projected for the future (2031) scenario, the ***City of Kawartha Lakes Growth Management Strategy*** projections (unit counts) were used. The plan simply provided the locations of future residential developments and the number of units expected to be developed between now and the year 2031. Units were separated by type (e.g., single-detached, semi-detached, townhouses, apartments, and seniors residents). Based on the locations of the developments, they were grouped according to how trips would disperse throughout the road network. The development grouping and unit counts are shown in **Exhibit 4-3**.

Using rates provided in the Institute of Transportation Engineers (ITE) publication ***Trip Generation Manual 9th Edition***, the magnitude of trips generated by each of the nine development groups was estimated for the weekday PM peak hour, by converting unit counts (for each dwelling type separately) into peak hour two-way trips. The weekday PM peak hour trip generation is summarized in **Table** 4-1.

Table 4-1: Weekday PM Peak Hour Trip Generation (Residential Developments)

Group	Developments	Total # Units	Trips Generated			Percent Total
			In	Out	Total	
1	1, 2, 3, BB	2,896	1,393	795	2,188	27%
2	20-25, AA	732	427	239	666	8%
3	U, X, DD	212	103	55	158	2%
4	4	765	370	207	577	7%
5	19, 26, R, S, T, V, W, KK	556	275	153	428	5%
6	12-18, P, Q, FF-JJ	1,121	617	343	960	12%
7	10, 11, D-O	1,864	865	477	1,342	16%
8	5- 9, B, C, EE	1,900	973	551	1,524	19%
9	A, Y, Z	806	238	130	368	4%
ALL	ALL	10,852	5,261	2,950	8,211	100%

The trips generated above comprise:

1. Trips between Lindsay and areas external to Lindsay, and
2. Trips within Lindsay (trips which do not leave Lindsay).

4.3.1.2 Residential Development Trip Distribution

To distribute and assign the trips projected in **Table 4-1**, the split between internal and external trips was necessary, as well as the origin-destination patterns for each development grouping. Information from the Transportation Tomorrow Survey 2006 (TTS) was employed. TTS separates Southern Ontario into traffic zones for the aggregation and interpretation of data which was collected during telephone surveys of households during 2006. The Town of Lindsay is itself quartered into four (4)

traffic zones. The 2006 TTS data also provided mode splits and trip purpose. An expansion factor was applied to the data since only a subset of households was surveyed.

For the weekday PM peak hour, 2006 TTS data indicated that 63% of trips originating from Lindsay (the 4 zones which comprise Lindsay) were destined internally, while the remaining 37% outbound trips were destined externally. Furthermore, 69% of trips destined to Lindsay (the 4 zones which comprise Lindsay) were of internal origin, while the remaining 31% were of external origin. The resultant internal and external trip distributions are summarized in **Table 4-2**. The 2006 TTS traffic zones are also show in **Exhibit 4-3**.

Table 4-2: Internal/External Residential Trip Distributions – PM Peak Hour

External Trips		
To/From	In	Out
North	28%	34%
South	23%	15%
West	24%	13%
East	25%	38%
Total	100%	100%

Internal Trip Origins				
From Zone	To Zone			
	8709	8710	8711	8712
8709	22%	2%	71%	5%
8710	28%	7%	47%	19%
8711	29%	8%	50%	13%
8712	20%	13%	42%	25%

Internal Trip Destinations				
To Zone	From Zone			
	8709	8710	8711	8712
8709	11%	10%	69%	10%
8710	3%	9%	66%	23%
8711	18%	9%	62%	11%
8712	5%	13%	58%	24%

The internal/external split was applied to the total trip generation for inbound and outbound trips separately, to determine the number of internal and external trips. Then using the distributions shown above, these trips were assigned to the road network. For internal trips, mode split reductions were applied as per the 2006 TTS research. Inbound trips were reduced by 7% and outbound trips were reduced by 5%. This reflects the existing non-vehicular mode split within Lindsay as of 2006. A conservative approach was used whereby the non-vehicle reduction for the future scenario was not increased (i.e. transit ridership remains the same relative to other modes including vehicular trips).

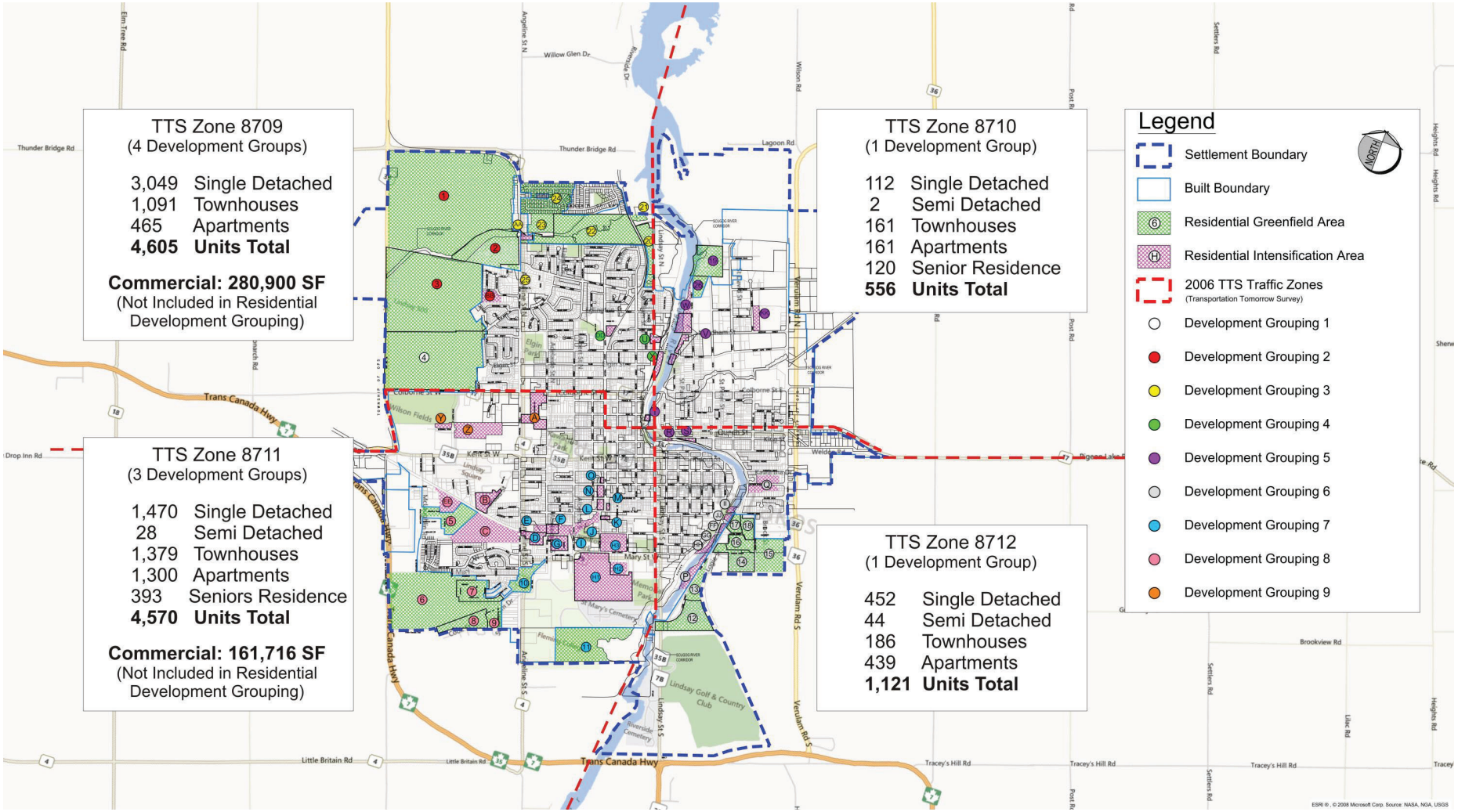


Exhibit 4-3: Development Grouping

4.3.1.3 Residential Development Trip Assignment

Trips were assigned on the existing road network based on professional judgment, existing traffic patterns, and future background road network improvements which were assumed as part of the future analysis. Trips originating and destined to locations external to Lindsay were assigned separately from those originating and destined to areas within Lindsay. Trips destined internally (specifically Zone 8711) were also "sunk" into commercial driveways to reflect intensification.

4.3.1.4 Commercial Development Trips

Trip generation for the residential component should technically account for the majority of the commercial trips which would be attributed to future commercial developments; however, some commercial trips may be externally generated, and the residential trip generation would not account for this. For a conservative analysis, commercial trips were added on for developments. In total, five commercial developments were accounted for; four of which had traffic impact studies from which volumes were taken.

4.3.1.5 2031 Total Traffic Volumes

Total traffic volumes were determined by applying background growth to existing traffic volumes, plus residential traffic projections, plus commercial traffic projections. Weekday PM peak hour total traffic volumes are depicted in **Exhibit 4-4**. The future 2031 total traffic volumes take into consideration all of the background road network improvements outlined in **Section 4.2.1.1** in terms of the impact on route selection.

4.3.2 Future Traffic Conditions and Deficiencies

Traffic operations on Colborne Street were assessed based on the projected 2031 PM peak hour traffic volumes shown in **Exhibit 4-4**, and the existing road network with background improvements outlined in **Section 4.2.1.1**. Traffic signal timings were optimized for this 2031 base (Do Nothing) scenario.

Signalized intersection operations are shown in **Exhibit 4-5** based on the overall intersection level of service, while unsignalized intersection operations are shown based on the level of service for the most critical turning movement. Level of service is an indicator of delay commonly used to identify congestion and deficiencies as they relate to the user experience ('A' being the best and 'F' being the worst).

Arterial link volume projections are also shown in **Exhibit 4-6** along with the anticipated percentage growth. Arterial level of service is shown in **Exhibit 4-7**.

Detailed operations analysis findings for future 2031 do nothing scenario are summarized in **Appendix C.1**.

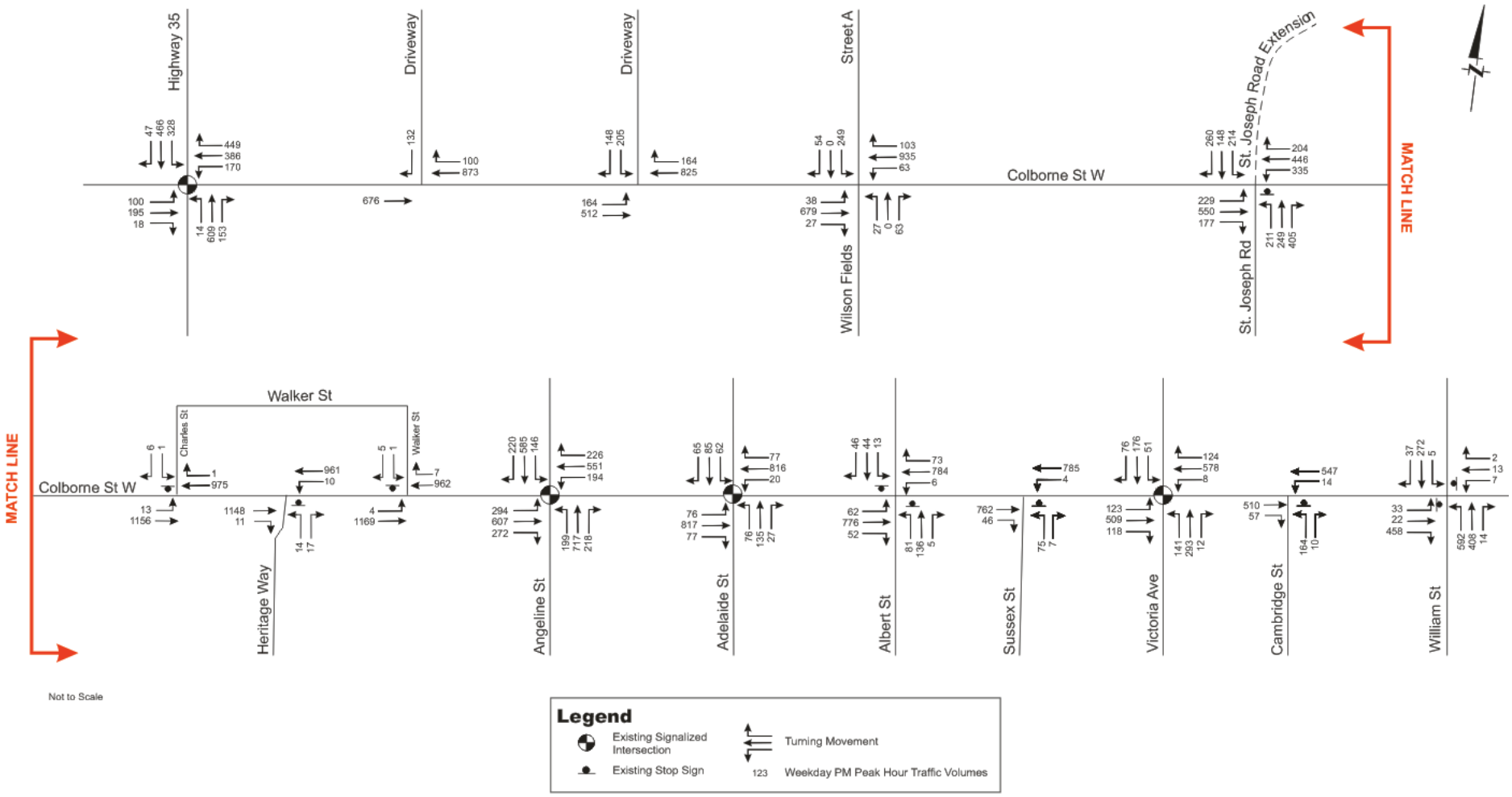


Exhibit 4-4: 2031 Forecast Traffic Volumes

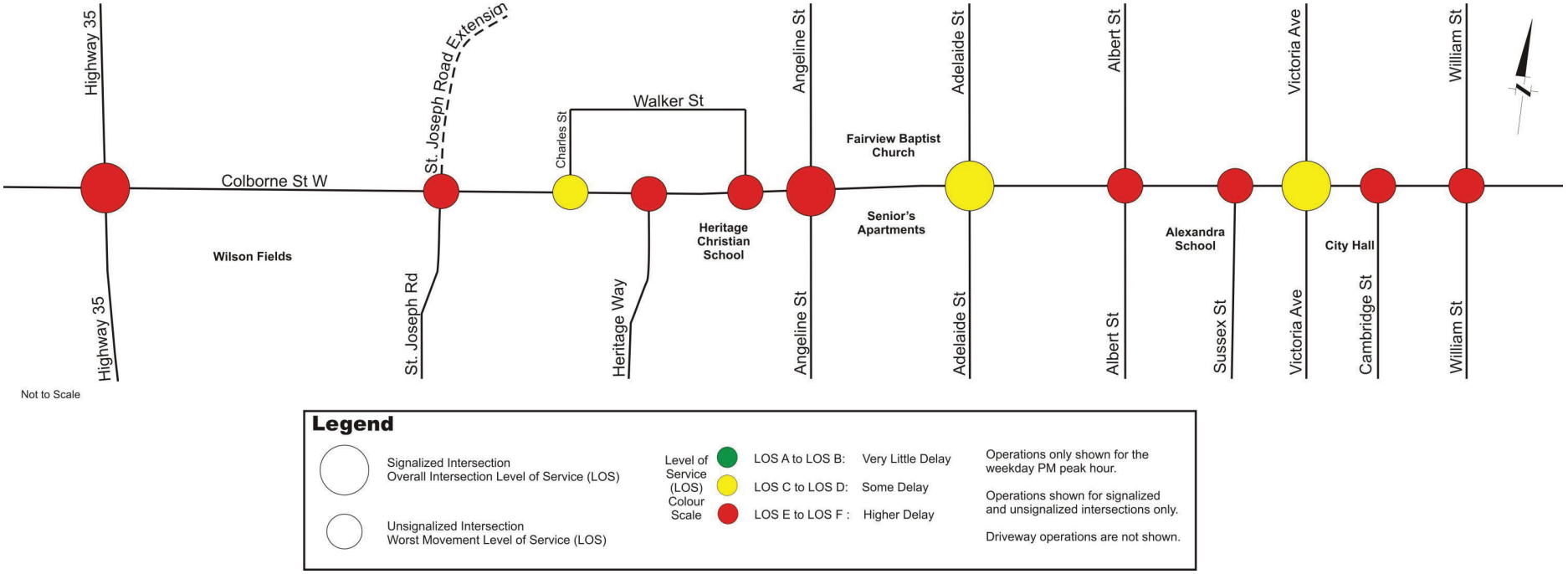


Exhibit 4-5: 2031 Traffic Operations (Do Nothing Scenario with Background Improvements Only)

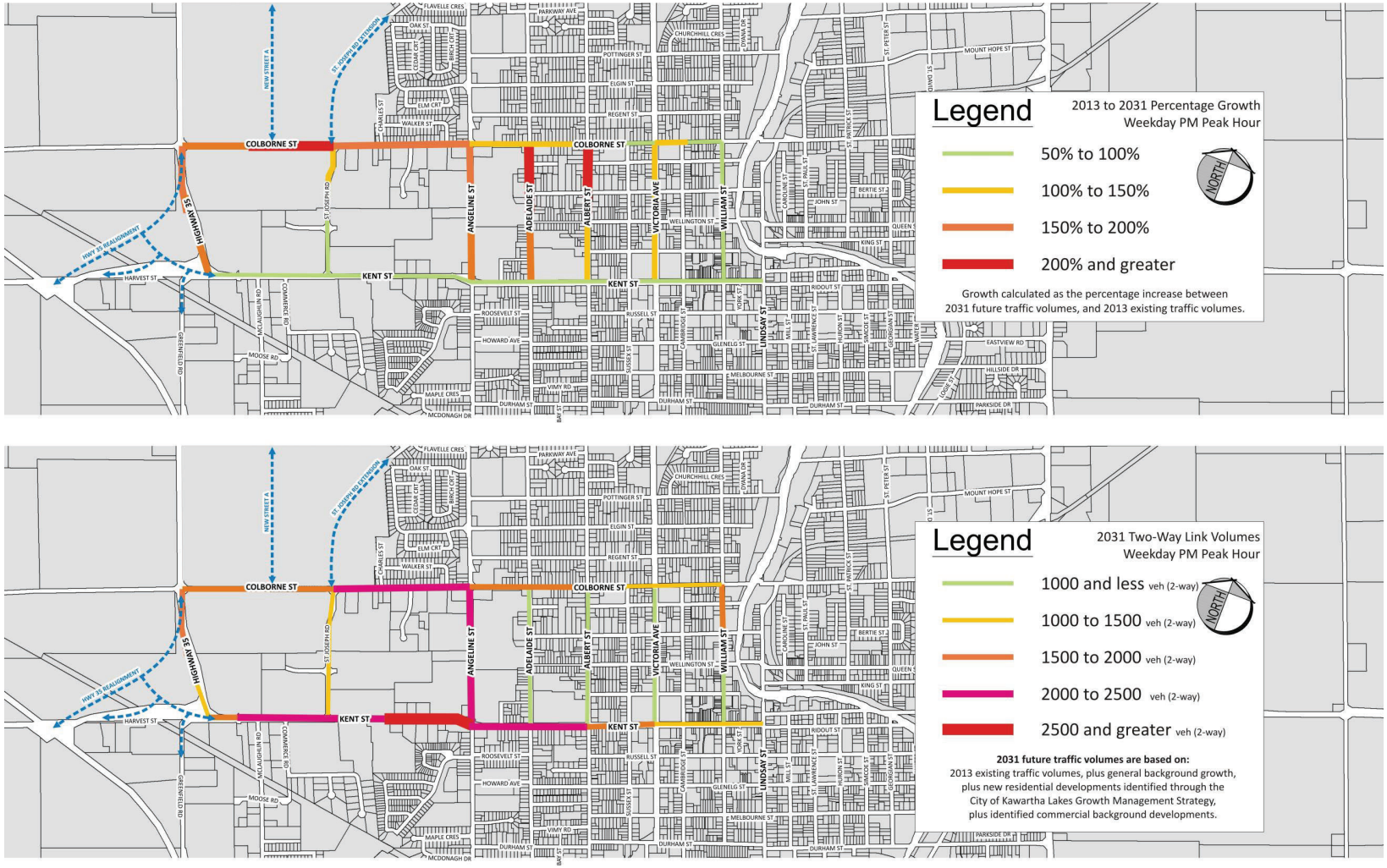


Exhibit 4-6: Arterial Link Volume Projections

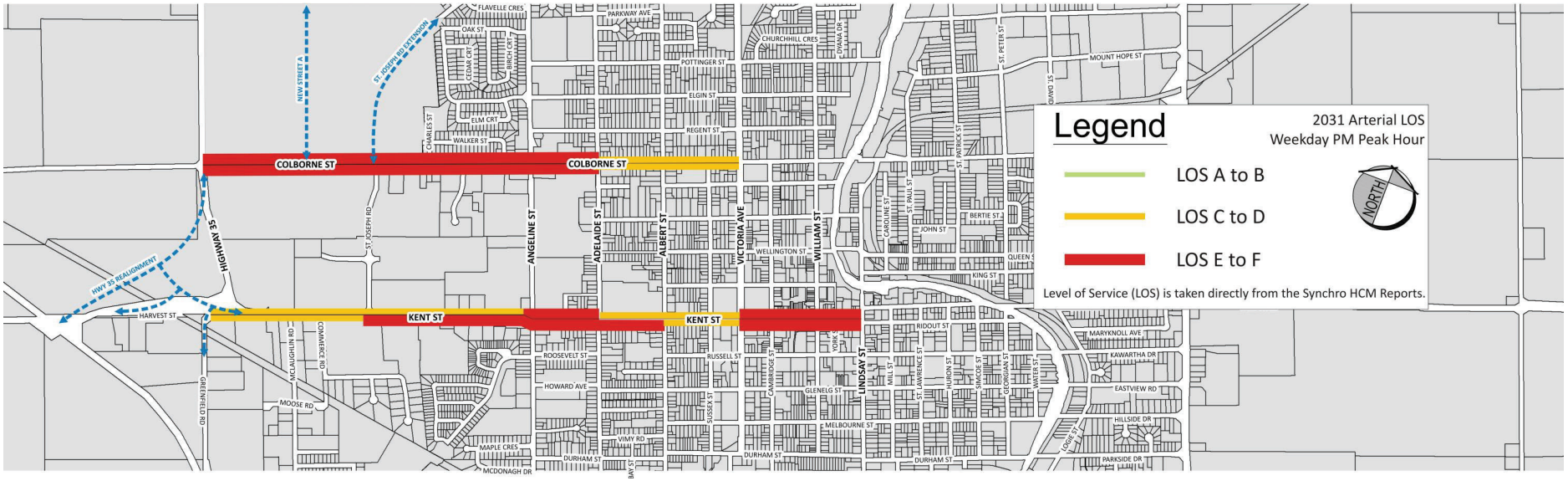


Exhibit 4-7: 2031 Arterial Level of Service (Do Nothing Scenario)

The following **unsignalized intersections** will be operating with unacceptable level of service under 2031 conditions (shown as red circles):

- St. Joseph Road at Colborne Street (assuming the north leg extension)
  - Minor street movements will be operating with level of service 'F' and with volume to capacity ratios well beyond 1.00, without signalization.
  - Mitigation measures include signalization to accommodate the extension of St. Joseph Road to the north, as well as widening along Colborne Street. Signalization and improvements will be part of the development process and as part of the process of widening Colborne Street.
- Heritage Way at Colborne Street
  - The northbound approach will operate with level of service 'F' and a volume to capacity ratio exceeding 1.00.
  - Mitigation measures include separation of northbound left and right-turn movements, addition of a centre two-way left-turn lane along Colborne Street, or signalization.
- Walker Street at Colborne Street
  - The southbound approach will operate with level of service 'F'.
  - Mitigation measures include separation of northbound left and right-turn movements, addition of a centre two-way left-turn lane along Colborne Street, or signalization.
- Albert Street at Colborne Street
  - The northbound and southbound approaches will operate with level of service 'F' and with volume to capacity ratios exceeding 1.00.
  - Mitigation measures include signalization.
- Sussex Street at Colborne Street
  - The northbound approach will operate with level of service 'F' and a volume to capacity ratio exceeding 1.00.
  - Mitigation measures include signalization.
- Cambridge Street at Colborne Street
  - The northbound approach will operate with level of service 'F' and a volume to capacity ratio exceeding 1.00.
  - Mitigation measures include signalization.
- William Street at Colborne Street
  - The eastbound and westbound approaches will operate with volume to capacity ratios exceeding 1.00, and level of service 'F'.

- Mitigation measures include geometric improvements plus signalization.

Some of the future capacity deficiencies and poor level of service which will be experienced by vehicles approaching Colborne Street from the minor streets (Albert Street, Sussex Street, Cambridge Street, and especially William Street) are a result of the *Colborne Street-William Street-Wellington Street* traffic pattern/route already observed under existing conditions. This traffic pattern or established route is closely tied with the Town's east-west river crossing capacity (or lack thereof). As the intersections along this route become more overloaded, drivers will find and burden alternative routes. This diversion has been incorporated into the analysis, and is in part the cause of some of these future capacity deficiencies.

The following **signalized** intersections will be operating with unacceptable level of service or with volume to capacity ratios exceeding 1.00, under 2031 conditions (shown as red circles):

- Highway 35 at Colborne Street
  - The westbound through approach and the southbound left-turn movement will be operating with level of service 'F' and a volume to capacity ratio well beyond 1.00. The eastbound approach will also operate with level of service 'E'.
  - Overall intersection level of service 'F'.
  - Mitigation measures include geometric improvements and widening along Colborne Street.
- Victoria Street at Colborne Street
  - The eastbound left-through-right which will be operating with a volume to capacity ratio of 1.00.
  - Overall intersection level of service 'C'.
  - Mitigation measures include separation of the eastbound left-turn and through-right movements.
- Adelaide Street at Colborne Street
  - The eastbound left-through-right will be operating with a volume to capacity ratio of 0.99. The northbound left-through-right will operate with level of service 'E'.
  - Overall intersection level of service 'C'.
  - The northbound approach at this intersection is wide enough to accommodate left-turns separately from through and right-turn movements. It is likely that operations are better than reported. This intersection should be monitored in the future to identify the need for separation of the northbound left-turn through painting an exclusive turn lane.

- Angeline Street at Colborne Street
  - All movements, with the exception of the southbound left-turn, will be operating with volume to capacity ratios of 1.00 or greater. All movements, with the exception of the southbound approach movements, will operate with level of service 'F'.
  - Overall intersection level of service 'F'.
  - Mitigation measures include geometric improvements and widening along Angeline Street.

4.4 Transportation System Needs and Opportunities

4.4.1 Active Transportation

Active transportation includes modes of travel such as walking and cycling. These modes utilize the available sidewalks, trails and cycling networks within the Town. Trails may also potentially be used by motorized vehicles such as all terrain vehicles (ATVs), or snowmobiles during the winter months. Active transportation can be integrated into both urban and rural environments and yield similar benefits.

The ***City of Kawartha Lakes Transportation Master Plan*** (February 2012) reiterated the sentiment of the ***Official Plan*** as well as in the ***Trails Master Plan for the City of Kawartha Lakes***. Active transportation is an excellent way to improve health, reduce congestion, and facilitate improved community cohesion. Active transportation has positive impacts on the environment as well as our health, and saves money for not only individuals but for the community as a whole. As shown in the Lindsay Area plan there are currently no trails internal to the study area, except for a proposed trail along Highway 35 to the west.

Improvements to the Colborne Street corridor present opportunities to improve accommodation for active transportation. The ***Transportation Master Plan*** summarized the issues raised by the ***Trails Master Plan***, and distinguished the issues between the trails and cycling network. Issues related to trails include "a need for urban by-pass routes, particularly for motorized trail uses". Since the study area does not contain any existing or proposed trails and would be described as urbanized, only the sidewalk and cycling network issues are relevant. They are reiterated below:

- A need for signed *safe cycling routes in the urban areas*;
- A need for cycling routes to connect the gaps in the Victoria Rail Trail Corridor (VRTC);
- A need to identify safe routes for children through the urban areas, *particularly in Lindsay*; and

- Public consultation feedback also identified the need to provide better cycling facilities along the corridor, feeding into the commercial area along Kent Street near St. Joseph Road.

The VRTC runs east-west to the south of the Town and does not impact the study area; however, it is clear that establishment of signed safe cycling routes within the town, with consideration to the safety of children, is extremely important. This was an important consideration throughout the study process. New cycling routes would be integrated with existing trails where possible, although there are currently no existing opportunities for integration at the study area periphery.

4.4.1.1 Sidewalks

As the Town grows, increased active transportation activity will also need to be accommodated safely along the Colborne Street corridor; however, some segments of the existing sidewalk has widths of only 1.2 m (west of Angeline Street) and will be insufficient to comfortably accommodate pedestrians, pedestrians with strollers, and scooters driven by seniors. There are existing issues with the narrow sidewalks including the difficulty for both directions to use the sidewalk at the same time as well as accommodating cyclists (including children) using the sidewalks. This study has reviewed the feasibility of accommodating wider 1.5-2.0 m sidewalks, and alternatively, 3.0 m multi-use paths which would be used by all modes of active transportation; all within the existing right-of-way width.

4.4.1.2 Pedestrian Crossings

As traffic volumes increase there will be fewer available gaps to accommodate pedestrians at existing crosswalk locations, mid-block locations where pedestrians are currently crossing illegally, and at existing traffic signals. As the number of available gaps decrease with increased traffic volumes, the difficulty of crossing also increases along with the likelihood of collisions. The following locations have been identified:

1. Colborne Street and Sussex Street – existing crosswalk location.
2. Colborne Street and Albert Street – unsignalized (north-south stop control).

Improvements to the Colborne Street corridor present opportunities to improve accommodation for pedestrian crossings through:

1. Modifications to the existing geometry.
2. Provision of entirely new crossing locations.
3. Modifications and updates to the existing signal timing (walk and don't walk times).
4. Crossing guard supervision where appropriate.

4.4.2 Transit Needs and Service Objectives

Local and inter-municipal transit needs have been reviewed in the past and there have been ongoing recommendations and changes to the transit system. The recommendations from the ***Transportation Master Plan*** remain valid.

Improvements to the Colborne Street corridor present opportunities to modify the existing routes based on new links and need for increased capacity. More importantly, the large number of new residential developments including the development of the Jennings Creek Development Plan Area will drive new origin-destination patterns which will directly impact bus routing based on demand. This should be monitored in the future to determine the best alternatives to implement, as new developments are constructed.

4.4.3 On-Street Parking

Improvements to the Colborne Street corridor could present opportunities to provide more on-street parking, modify existing on-street parking, or to recommend locations for future parking provision off-street. There is also the potential to reduce parking demand through transportation demand management measures (TDM), which would include expansion to public transit or active transportation facilities as a means to increase non-vehicular trips and decrease parking demand.

5 PROBLEM STATEMENT

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031. This is a population increase of approximately 33% from 2011. Some of this growth is expected to occur within Lindsay, and as a result, traffic volumes are expected to increase anywhere between 50% to over 200% compared to 2013 traffic volumes, depending on the location. As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes without improvements to address increased vehicle-vehicle and vehicle-pedestrian conflicts.

Colborne Street will operate with level of service 'E' and 'F' during the weekday PM peak hour. Two out of four signalized intersections will operate with overall level of service 'E' or 'F'.

While the goal is to improve and accommodate vehicular flow, pedestrian and cyclist safety will also be impacted by the City's growth. These modes of travel must be addressed through improvement options that will provide a balanced approach.

Transportation solutions are necessary to enhance the safety and mobility of motorists, pedestrians, and cyclists along the corridor, and to address projected capacity deficiencies. This includes maintaining and enhancing the character of the existing Colborne Street through streetscaping opportunities, while still enhancing the transportation system and providing increased capacity.

6 ANALYSIS AND EVALUATION OF PLANNING ALTERNATIVES

The Schedule 'B' MEA Class Environmental Assessment process requires documentation and examination of all reasonable alternatives, or means to address the problem, referred to as planning alternatives. An evaluation is undertaken to ensure that the process is traceable and reproducible, and that technical, social, economical, and environmental components are considered as part of the evaluation process. This section introduces the proposed planning alternatives considered, discusses the evaluation methodology used, and presents the evaluation of each alternative and the recommended alternative.

6.1 Development and Evaluation of Planning Alternatives

Each of the planning alternatives considered present a different approach to address the problems and opportunities identified for this study. To determine the most appropriate functional solution for the corridor, advantages and disadvantages of each planning alternative were identified and evaluated to determine the best functional solution.

6.1.1 Development of Planning Alternatives

The following planning solutions were considered:

a) **Do Nothing** – no improvements;

b) **Travel Demand Management Measures** – encourage non-vehicle modes of travel;

c) **Improve Transit** – implement new routes or improved service;

d) **Improve Active Transportation Network** – sidewalks, multi-use paths, bicycle lanes;

e) **Intersection Improvements** – new signal timing, signal coordination, and turning lanes; and

f) **Improve Road Network** – road widening to provide through-capacity (within existing right-of-way).

Each planning alternative is described in further detail below:

a) **Do Nothing**

This alternative was included in the assessment to provide a benchmark against which the other alternatives could be compared. This planning alternative

represents a continuation of existing conditions and would involve no changes or improvements to the existing transportation network.

b) and c) **Travel Demand Management & Transit Service Improvements**

These alternatives are closely tied since they both involve methods to modify existing and future travel demand by reducing the proportion of single-occupant vehicular travel during the peak travel periods. Measures such as designated HOV lanes, carpooling, improved active transportation facilities, transit pass incentives and of course increases in transit service, all help reduce the proportion of single-occupant vehicle use.

d) **Improve Active Transportation Network**

The active transportation alternative is also closely linked to travel demand management as it serves to improve the active transportation network, hopefully encouraging a higher proportion of its use and conversion of trips which are currently vehicular under existing conditions. Opportunities include improving sidewalks, or providing bicycle lanes or multi-use paths.

e) **Intersections Improvements**

This alternative includes methods to increase the capacity at specific intersections, such as changes to traffic signal timings and phasing, coordination of traffic signals, intersection geometric improvements, and adding or changing exclusive turn lanes at intersections.

f) **Improve Road Network**

This alternative involves adding capacity to the road network through widening of existing corridors to provide additional through lanes within the existing right-of-way or outside the right-of-way.

The alternatives listed above are roughly ordered in terms of the potential property requirements for each respective improvement, beginning with no property requirements in the Do Nothing alternative. These alternatives can be implemented in conjunction with each other, and to varying degrees.

6.1.2 Planning Alternatives Evaluation Criteria

The evaluation criteria listed below were developed following the requirements and guidelines of the ***Municipal Class EA*** document, and include inputs received during the consultation process with the Project Review Team.

The advantages and disadvantages of each planning alternative should be evaluated following a clear, traceable and reproducible methodology, taking into account technical, as well as economic, social, and environmental considerations.

Transportation Service

- Level of Service
- Traffic Congestion and Delays
- Public Transit Service
- Accommodation of Pedestrians and Cyclists
- Traffic Safety

Socio-Economic Impacts

- Business Impacts
- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Archaeological / Cultural Heritage Resources
- Visual Aesthetics
- Accommodation of Planned Development

Natural Environment

- Vegetation
- Green Space
- Air Quality

Engineering

- Capital Costs
- Operating Costs
- Property Acquisition
- Utility Relocation

6.1.3 Analysis and Evaluation of Planning Alternatives

The planning alternatives were evaluated based on the ability of the alternative to address the problem statement, including impacts to transportation, anticipated property impacts, and environmental impacts.

Following the evaluation, a recommendation was made on which Planning Alternative(s) would be carried forward to the next stage. **Table 6-1** contains the evaluation of the alternative planning solutions and a summary of the impacts and recommendations.

6.1.4 Recommended Planning Alternative

Colborne Street is an important transportation corridor in the Town, and will become more important as the Town continues to grow. This road serves as one of the primary main east-west links through the Town. Providing adequate capacity in this corridor is critical to planning for the economic growth and well-being of the Town of Lindsay, as well as the City of Kawartha Lakes. The need for improvements along this corridor has been identified in the ***Transportation Master Plan***.

Based on the assessment and evaluation of the Planning Alternatives, the preferred and recommended planning solution is a combined and balanced approach; to incorporate transportation demand management measures and improve transit service where appropriate and as opportunities arise, with a primary focus on improving active transportation facilities and to provide specific intersection improvements where necessary.

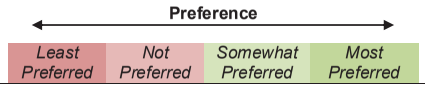
Widening along the Colborne Street corridor to provide additional lane capacity may be necessary from a capacity perspective but would sacrifice the opportunity to improve the active transportation network through new or improved facilities (widening the existing sidewalks or providing new multi-use paths).

One important note is that through the public consultation process residents expressed concerns with the potential for new traffic being funnelled through residential areas and creating high-volume pedestrian unfriendly environments. Refer to **Section 8.6**. Thus, it seems there is a preference to improving active transportation and safety for those modes of travel, rather than improving vehicular capacity along the corridors such that it would *encourage* higher volumes, rather than simply accommodate the expected traffic volumes.

Table 6-1: Analysis and Evaluation of Planning Alternatives

Criteria	ALTERNATIVE a) Do Nothing	ALTERNATIVE b) and c) Travel Demand Management & Transit	ALTERNATIVE d) Improve Active Transportation Network	ALTERNATIVE e) Intersection Improvements	ALTERNATIVE f) Network Improvements (Widening)
Transportation ▪ Level of Service and Delays ▪ Traffic Congestion and Capacity ▪ Public Transit Service ▪ Accommodation of Pedestrians and Cyclists ▪ Traffic Safety	▪ Capacity needs not met ▪ Level of service is poor ▪ Improved transit, pedestrian, and cyclist objectives are not met ▪ Safety improvement objectives are not met	▪ Minimal capacity and level of service improvements due to reduced single occupant vehicle use and expected mode share shift ▪ Reduction in vehicles and improved transit may not improve the existing safety concerns on Colborne Street ▪ Pedestrian, and cyclist objectives are not met ▪ Promotes sustainability goals	▪ Minimal capacity improvements due to reduced single occupant vehicle use ▪ Minimal level of service improvements due to reduced single occupant vehicles ▪ Safety and accommodation objectives are met for pedestrian and cyclist safety ▪	▪ Major capacity improvements ▪ Major level of service improvements ▪ Transit, pedestrian, and cyclist objectives are not met ▪ Intersection improvements may address safety issues through redesign and elimination of sight line issues ▪ Transit service may have to deal with bus stops in turn lanes	▪ Widening improves capacity and level of service but at the expense of other modes. Widening only necessary from a capacity perspective, west of Angeline Street ▪ Longer pedestrian crossings if Colborne Street is widened ▪ Widening could result in increased vehicle speeds ▪ Potential for reduced safety due to added through lanes ▪ Transit, pedestrian, and cyclist objectives are not met ▪ No change to transit service
Natural Environment ▪ Vegetation ▪ Green Space ▪ Air Quality	▪ No impacts to vegetation, green spaces ▪ Air quality may be reduced due to increased congestion	▪ No impacts to natural environment ▪ Reduction in single occupant vehicles and improved transit will reduce overall emissions which should lead to minor improvements to air quality	▪ No impacts to vegetation unless boulevard is used for multi-use path ▪ Air quality may experience minor improvement due to reduced congestion	▪ Some impacts to vegetation, aquatic habitat, surface water and green spaces if turning lane improvements require boulevard or additional property ▪ Air quality may experience minor improvement due to reduced congestion	▪ Major impacts to vegetation and green spaces ▪ Air quality may experience minor improvement due to reduced congestion, but may be offset with more pollutants from greater vehicle volumes
Socio-Economic Impacts ▪ Business Impacts ▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Archaeological / Cultural Heritage Resources ▪ Visual Aesthetics ▪ Accommodation of Planned Development	▪ Future congestion contributes to noise and air quality impacts ▪ No impact to residences, businesses, or institutions except where affected by congestion to gain access ▪ No impact to recreational facilities ▪ No impact to archaeological or cultural heritage features ▪ No change to aesthetics ▪ Planned development may not be achievable without improvements	▪ May potentially reduce some of the congestion, thus reducing noise impacts ▪ Potential for increased transit to improve access to institutional and recreational uses ▪ No impact to archaeological or cultural heritage features ▪ No change to aesthetics ▪ Planned development may not be achievable relying on only TDM measures and improved transit	▪ May potentially reduce congestion, thus reducing noise and air quality impacts ▪ Potential for increased active transportation use to generate more business activity, and particularly more recreational activity ▪ No impact to archaeological or cultural heritage features ▪ Potential for improvements to aesthetics due to larger boulevards and multi-use pathways	▪ Will reduce congestion, thus reducing noise and air quality impacts ▪ Potential to generate more business and recreational activity by providing more capacity for people to reach destinations ▪ potential impact to archaeological or cultural heritage features ▪ Will impact aesthetics at intersections where improvements are necessary.	▪ Noise pollution may experience minor improvement due to reduced congestion, but may be offset by increased volume ▪ Potential to generate more business and recreational activity by providing more capacity for people to reach destinations ▪ Potential impact to archaeological or cultural heritage features ▪ Will impact aesthetics of corridors
Engineering ▪ Capital Costs ▪ Operating Costs ▪ Property Acquisition ▪ Utility Relocation	▪ No impacts to utilities ▪ No capital costs ▪ No change to operating costs ▪ No property acquisition	▪ No impacts to utilities except where new bus stop locations may be installed ▪ Some capital costs for transit fleet and route expansion ▪ No change to operating costs, potential for increased revenue ▪ No property acquisition	▪ Potential impacts to utilities where sidewalks will be widened or multi-use paths or bicycle lanes are constructed ▪ Some capital costs ▪ Minimal maintenance costs ▪ No property acquisition	▪ Potential impacts to utilities depending on the specific improvements required ▪ Capital costs depend on the improvements required ▪ Potential for increased maintenance costs ▪ Property acquisition dependant on improvements required	▪ Utility relocation probable ▪ High capital costs ▪ Increased maintenance costs ▪ Potential property acquisition
Recommendation	***Not Recommended***	***Recommended in Combination***	***Recommended in Combination***	***Recommended in Combination***	***Recommended in Combination***

Colour Scale Legend:



6.1.5 Scugog River Bridge Crossing

As previously mentioned, a new crossing of the Scugog River is outside the limits of the Colborne Street study area; however, a new crossing will impact the corridor, specifically intersections along the corridors easterly end as well as nearby intersections peripheral to the study area. This section describes the implications of constructing a bridge crossing using 2031 forecasted traffic volumes even though the bridge crossing is not assumed to be a committed or planned improvement by 2031.

The location of a new bridge along Colborne Street was determined through the Council Report (Scugog River Bridge Crossing) dated September 22, 2015. Specifically, the resolution was that when crossing demands reach 26,800 vehicles per day, additional crossing capacity will be provided by a Colborne Street crossing of the Scugog River. Based on future traffic volume projections, this threshold could be reached around the year 2031.

The intersection on the Colborne Street corridor most affected by the presence of a new bridge would be the intersection of Colborne Street with William Street since new traffic will be attracted to this intersection. Two other intersections will be primarily impacted by the new crossing. The greatest impact is expected at the intersections of William Street and Wellington Street, as well as Lindsay Street and Wellington Street, since these intersections provide direct access to the Wellington Street bridge. The following analysis therefore focuses on these two intersections in addition to Colborne Street at William Street, when comparing the 'with bridge' and 'without bridge' scenarios.

Other intersections to the west along Colborne Street would also be impacted by a diversion of trips. Without the bridge, the northbound approaches at intersections along Colborne Street at Cambridge Street, Victoria Street, Sussex Street, and Albert Street are anticipated to operate with capacity deficiencies and poor level of service during the PM peak hour due to a strong attraction for vehicles to travel from the south-east to north-west (see **Section 4.3.2**). At the intersection of Colborne Street and William Street the northbound left-turn movement is expected to approach capacity with nearly 600 vehicles per hour and a volume to capacity ratio of 0.92 – and this already reflects a diversion of trips to the northbound approaches to the west of William Street (i.e. vehicles continue west along Wellington Street before turning north). Without the diversion, the demand for this movement would be over 600 vehicles per hour.

Providing a bridge at the east end of Colborne Street would likely divert these northbound approach volumes to the new Colborne Street bridge, and the traffic would then pass westbound through these intersections instead of adding demand to the minor northbound approaches. This diversion will provide an overall benefit for the corridor but is not driving the need for an additional crossing. For this reason these less critical intersections were not analyzed to quantify the benefits.

For this exercise the following assumptions were made for the intersection of Colborne Street at William Street:

- the east leg of the intersection continues over the Scugog River and connects Colborne Street West to Colborne Street East;
- the intersection of Colborne Street and William Street is signalized in the future scenario with a 90s cycle length. This is required with or without the bridge from an operational perspective. The projected volumes also meet the Ministry of Transportation of Ontario Book 12 signal warrant justification for projected volumes;
- the northbound and southbound approaches have exclusive left-turn lanes, and shared through-right turn lanes, and, the eastbound and westbound approaches have a shared through-left turn lane, and an exclusive right-turn lane.

In addition to the above, the following assumptions were made:

- background traffic as well as future development traffic will be rerouted or diverted due to the new crossing;
- the intersections of William Street and Wellington Street, as well as Lindsay Street and Wellington Street, will maintain the same cycle lengths and general timing parameters, as well as lane configurations; and,
- signal timing was optimized for all three intersections under each scenario.

A comparison of traffic volumes for the three intersections is shown in **Exhibit 6-1** for the two scenarios as well tabulated in **Table 6-2**.

Table 6-2: Scugog River Bridge Volume Comparison (Impacts of Diversion)

Location	Without Bridge	With Bridge	% Difference
Total Hourly Intersection Volume			
Colborne Street at William Street	1,860	2,320	+25%
William Street at Wellington Street	2,600	1,090	- 58%
Wellington Street at Lindsay Street	3,110	1,960	- 37%
Two-Way Hourly Volume			
Colborne Street Bridge	n/a	1,450	n/a
Wellington Street Bridge	2,100	670	- 68%

The traffic diversion as a result of the bridge being constructed along Colborne Street will attract 25% more traffic to the intersection of William Street and Colborne Street, which is expected. However, the total volumes at the two other intersections will decrease by -37% and -58%. The two-way volumes along the Wellington Street bridge will also be reduced by nearly -70%.

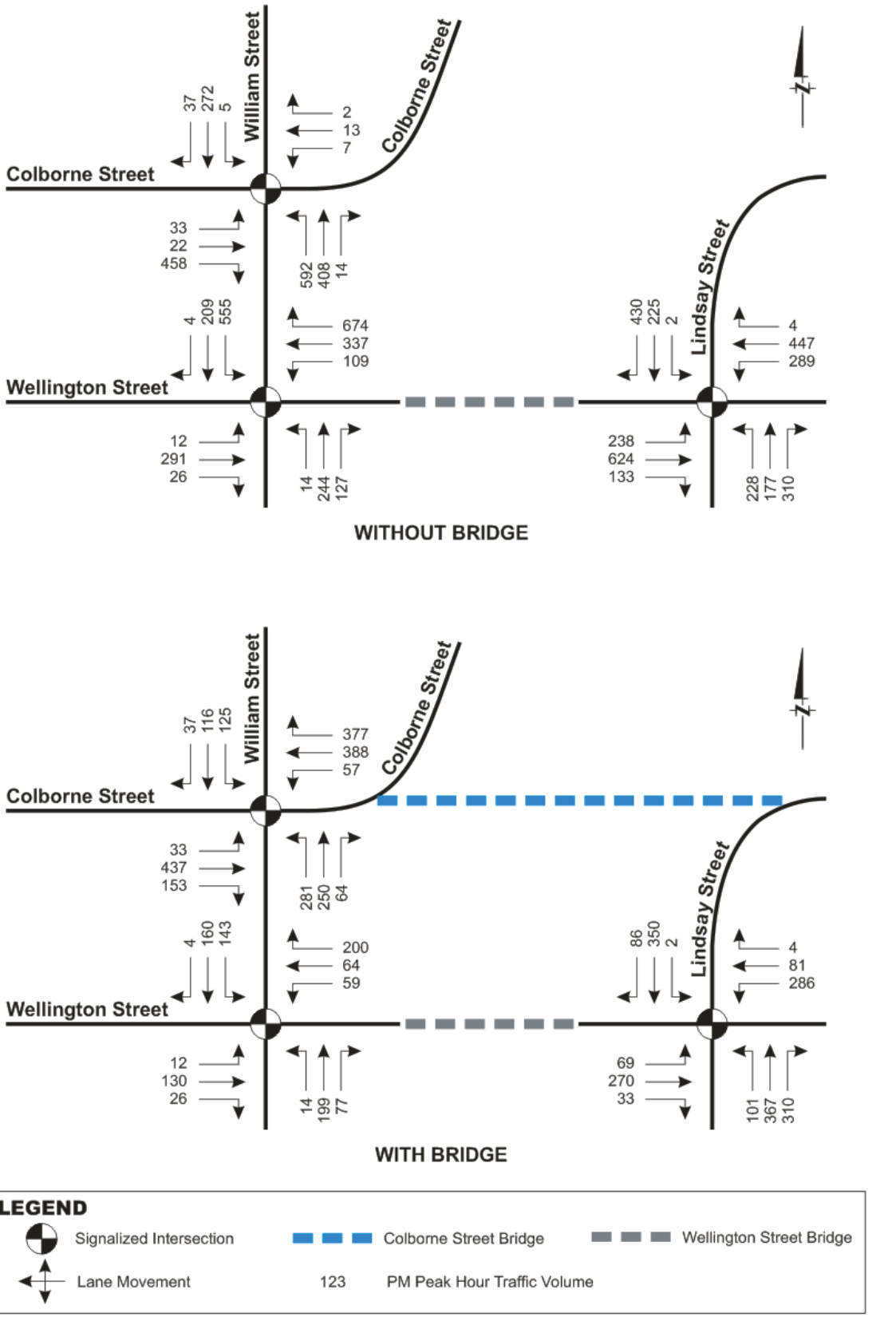


Exhibit 6-1: Scugog River Bridge Volume Comparison (Impacts of Diversion)

Operations for each scenario are summarized in **Table 6-3**.

Table 6-3: Scugog River Bridge (Colborne Street) Operations Comparison

Movement	Without Bridge		With Bridge	
	LOS	v/c	LOS	v/c
Colborne Street at William Street				
Overall	**C**	**0.86**	**C**	**0.93**
Eastbound Left-through	C	0.34	C	0.72
Eastbound Right-turn	C	0.37	B	0.17
Westbound Left-through	C	0.12	D	0.92
Westbound Right-turn	C	0.00	B	0.35
Northbound Left-turn	C	0.92	D	0.84
Northbound Through-right	A	0.38	C	0.55
Southbound Left-turn	C	0.03	D	0.76
Southbound Through-right	D	0.86	C	0.49
William Street at Wellington Street				
Overall	**F**	**1.63**	**C**	**0.46**
Eastbound Left-turn	D	0.16	C	0.07
Eastbound Through-right	F	1.16	D	0.54
Westbound Left-turn	C	0.33	C	0.16
Westbound Through-right	F	1.64	C	0.29
Northbound Left-turn	C	0.05	C	0.05
Northbound Through-right	D	0.82	C	0.58
Southbound Left-turn	F	1.34	B	0.27
Southbound Through-right	B	0.24	B	0.18
Wellington Street at Lindsay Street				
Overall	**F**	**1.24**	**C**	**0.86**
Eastbound Left-through	F	1.47	D	0.81
Eastbound Right-turn	B	0.11	C	0.02
Westbound Left-turn	F	1.41	C	0.82
Westbound Through-right	B	0.47	B	0.12
Northbound Left-turn	D	0.82	B	0.31
Northbound Through-right	D	0.87	D	0.91
Southbound Through-left	C	0.45	B	0.47
Southbound Right-turn	C	0.45	B	0.06

Note that the Wellington Street bridge demand without an additional crossing at Colborne Street is projected to be 2,100 vehicles during the PM peak hour (two-way volume). This is the approximate capacity of the bridge considering it is only one lane per direction and is metered by traffic signals on either side.

As shown in **Table 6-3**, although the bridge will add additional burden to the intersection of Colborne Street at William Street in the amount of 25% additional traffic volume, the overall level of service will remain 'C'. The overall volume to capacity ratio will be 0.93 which is an increase from 0.86 without the bridge at Colborne Street, but all movements will continue to operate with level of service 'D' or better and volume to capacity ratios of 0.92 or better. Overall the impact to this intersection remains within acceptable thresholds.

A comparison of the bridge volumes shows that the diversion resulted in the new Colborne Street bridge carrying 1,450 two-way hourly trips, and the existing Wellington bridge would be reduced to only 670 two-way hourly trips. This diversion is based on the most direct routes. Therefore, there is a tendency for traffic diversion to stabilize so that demand on both bridges is more equivalent. Despite how much traffic is diverted to the new crossing, both bridges would operate with additional capacity, whereas without the bridge the Wellington Street bridge appears to be reaching capacity by 2031 during the PM peak hour.

More importantly, the intersections of William Street at Wellington Street, and Wellington Street at Lindsay Street, will experience significant reductions in overall traffic volumes and major improvements to operations. Overall level of service for both intersections will be improved from 'F' to 'C', and all movements operating at capacity and with level of service 'F' will be improved to acceptable thresholds. Even if the bridge volumes do equalize and result in slightly higher traffic volumes at these two intersections, there will still be major improvements with only minimal impacts to the intersection of Colborne Street at William Street.

This analysis displays the benefit that can be attributed to a new crossing located at Colborne Street in terms of the broader context of overall crossing capacity and other surrounding intersections not directly within the Colborne Street or Kent Street study areas. It also indicates that despite additional traffic being attracted to the intersection of Colborne Street at William Street, this intersection will continue to operate within acceptable thresholds. In general, providing a more refined grid network will help disperse traffic throughout the road network, improving level of service.

7 EVALUATION OF ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION

This section of the report provides a discussion on the development and evaluation of the design concepts considered for the corridor. These concepts further detail the type of improvements that support the balanced approach of providing active transportation, transit, and intersection improvements.

7.1 Development and Evaluation of Design Concepts

The existing Colborne Street corridor has different characteristics through the 2.7 km study area, including different land uses, cross-sections, and right-of-way widths. To address these varying characteristics and the preferred planning solution, the development and evaluation of design concepts for sections of the study area were required. They include:

1. Cross-section of Colborne Street:

   a) West of St. Joseph Road

      - *Option O*: Do Nothing
      - *Option 1*: Widen to four lanes, new sidewalk north side, 2 m sidewalk on both sides
      - *Option 2*: Widen to four lanes, 3 m multi-use path on both sides

   b) East of St. Joseph Road

      - *Option O*: Do Nothing
      - *Option 1*: 3-lane cross-section with centre two-way left-turn lane, multi-use path on both sides
      - *Option 2*: Widen to four lanes, multi-use path on both sides

   c) West of Angeline Street

      - *Option O*: Do Nothing
      - *Option 1*: Multi-use path on south side of street
      - *Option 2*: Multi-use path on south side of street. Exclusive eastbound right-turn lane.
      - *Option 3*: Widen to four lanes including exclusive eastbound left-turn lane. 1.2 m sidewalk on south side

   d) East of Angeline Street

      - *Option O*: Do Nothing

- *Option 1*: Increase sidewalk width on both sides, increase boulevard width on both sides, maintain parking lane on north side
- *Option 2*: Widen to three lanes with centre two-way left-turn lane, multi-use path on both sides of the street
- *Option 3*: Widen to four lanes, multi-use path on south side, sidewalk on north side

e) East of Victoria Street

- *Option O*: Do Nothing
- *Option 1*: Increase sidewalk width on north side, provide sidewalk on south side, boulevard on both sides, maintain parking lane on north side
- *Option 2*: Parking lane on north side, multi-use paths on both sides

f) West of Cambridge Street

- *Option O*: Do Nothing
- *Option 1*: Sidewalk (1.5 m) on south side, bike lanes on both sides
- *Option 2*: Parking lane and multi-use path on north side, 1.5 m sidewalk on south side
- *Option 3*: Parking lane on north side, 2 m sidewalks on both sides of the street

2. Improvements to the Angeline Street Intersection (Includes Angeline Street Widening):
   - *Option O*: Do Nothing
   - *Option A*: Turning lane improvements on Colborne (new exclusive eastbound and westbound right-turn lanes), plus widening to five lanes along Angeline Street including left-turn lanes)
   - *Option B*: Widening both Angeline and Colborne to five-lane cross section
3. Improvements to the Highway 35 Intersection (Includes Colborne Street Widening and Assumed Highway 35 Widening):
   - *Option O*: Do Nothing
   - *Option A*: Widening and improvements
4. Improvements to the Victoria Street Intersection:
   - *Option O*: Do Nothing
   - *Option A*: Geometric improvements

5. Sussex Street Intersection Improvements and Pedestrian Accommodation
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals
6. Albert Street Intersection Improvements and Pedestrian Accommodation
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals
7. William Street Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals, and geometric improvements
8. Cambridge Street Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals
9. Walker Street Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Provide centre two-way left-turn lane along Colborne Street
10. Heritage Way Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Provide centre two-way left-turn lane along Colborne Street
11. Transit Network Improvements
    - *Option O*: Do Nothing
    - *Option A:* Route extensions or alterations, and new routes

Operations reflecting the recommended improvements are provided in **Appendix C.2**.

7.1.1 Evaluation Criteria

The evaluation of the design concepts required the development of evaluation criteria and the formulation of a methodology to evaluate these criteria. The evaluation criteria were developed based on impacts to the natural, social, economic and cultural environments and impacts on transportation. Using the evaluation criteria, where applicable, the advantages and disadvantages of each design concept were identified. The evaluation criteria used in the assessment include:

Transportation Service

- Level of Service
- Traffic Congestion and Delays
- Public Transit Service
- Accommodation of Pedestrians and Cyclists
- Traffic Safety

Socio-Economic Impacts

- Business Impacts
- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Archaeological / Cultural Heritage Impacts
- Visual Aesthetics
- Accommodation of Planned Development

Natural Environment

- Vegetation
- Green Space
- Air Quality

Engineering

- Capital Costs
- Operating Costs
- Property Acquisition
- Utility Relocation

The following sections provide details on the design concepts and identify the resulting recommendation.

7.1.2 Cross-section of Colborne Street

To address the planning solution to incorporate pedestrian and cycling facilities into the Colborne Street corridor, several options were considered for the varying cross-sections along Colborne Street, all accommodated within the existing right-of-way. Due to the variation in the existing cross-section, the corridor was segmented into four parts and options specific to each segment were developed and assessed. The segments where cross-sections were developed for Colborne Street are:

a) West of St. Joseph Road;
b) East of St. Joseph Road;
c) West of Angeline Street;
d) East of Angeline Street;
e) East of Victoria Street; and
f) West of Cambridge Street.

As of January 26, 2016, Council adopted the ***City of Kawartha Lakes Streetscape and Façade Design Guidelines – Lindsay Report***. The purpose of this document is to help develop a consistent aesthetic for specific areas and for the City as a whole, and to correct the apparent lack of identify within some of the Kawartha Lakes communities as identified through public consultation. The guidelines are catered towards non-residential areas and are instead geared towards Business Improvement Areas and tourist areas. Since Colborne Street is predominantly residential these guidelines may have less of an impact, but some of the guiding principles may be applied such as the implementation of consistent lighting standards or sidewalk and multi-use path paving.

Exhibit 7-1 to **Exhibit 7-6** illustrate the alternatives reviewed for each segment. The alternatives include providing wider sidewalks ranging from 1.5 m to 2.0 m in tandem with bicycle lanes, or 3.0 m multi-use paths which would accommodate both cyclists and pedestrians. The alternatives also consider adding lanes on Colborne Street to provide additional capacity. The evaluation of these options is discussed in **Table 7-1** through **Table 7-3**, and a technically preferred recommendation is provided for each segment.

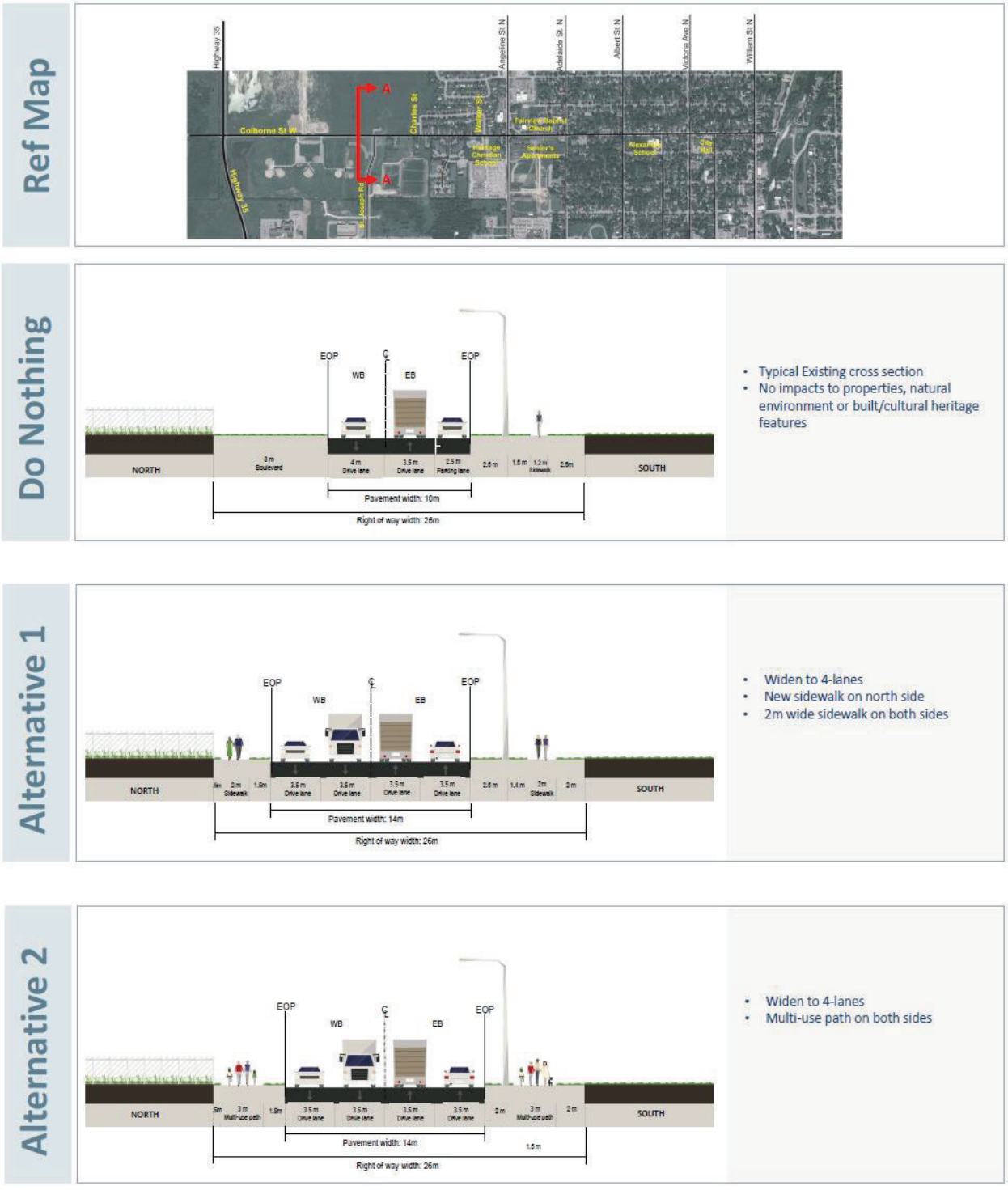


Exhibit 7-1: Segment A: Colborne Street - West of St. Joseph Road

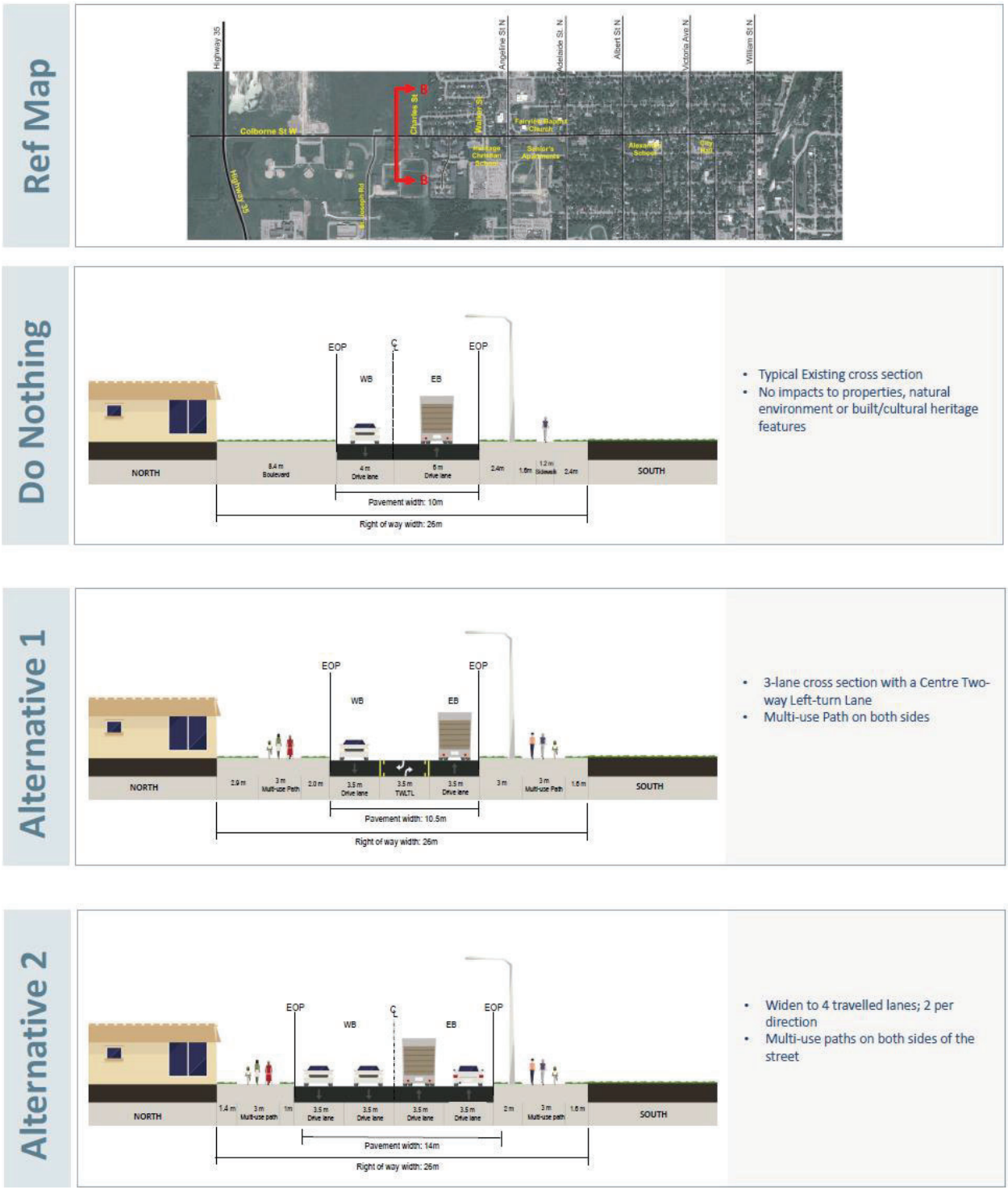


Exhibit 7-2: Segment B: Colborne Street – East of St. Joseph Road

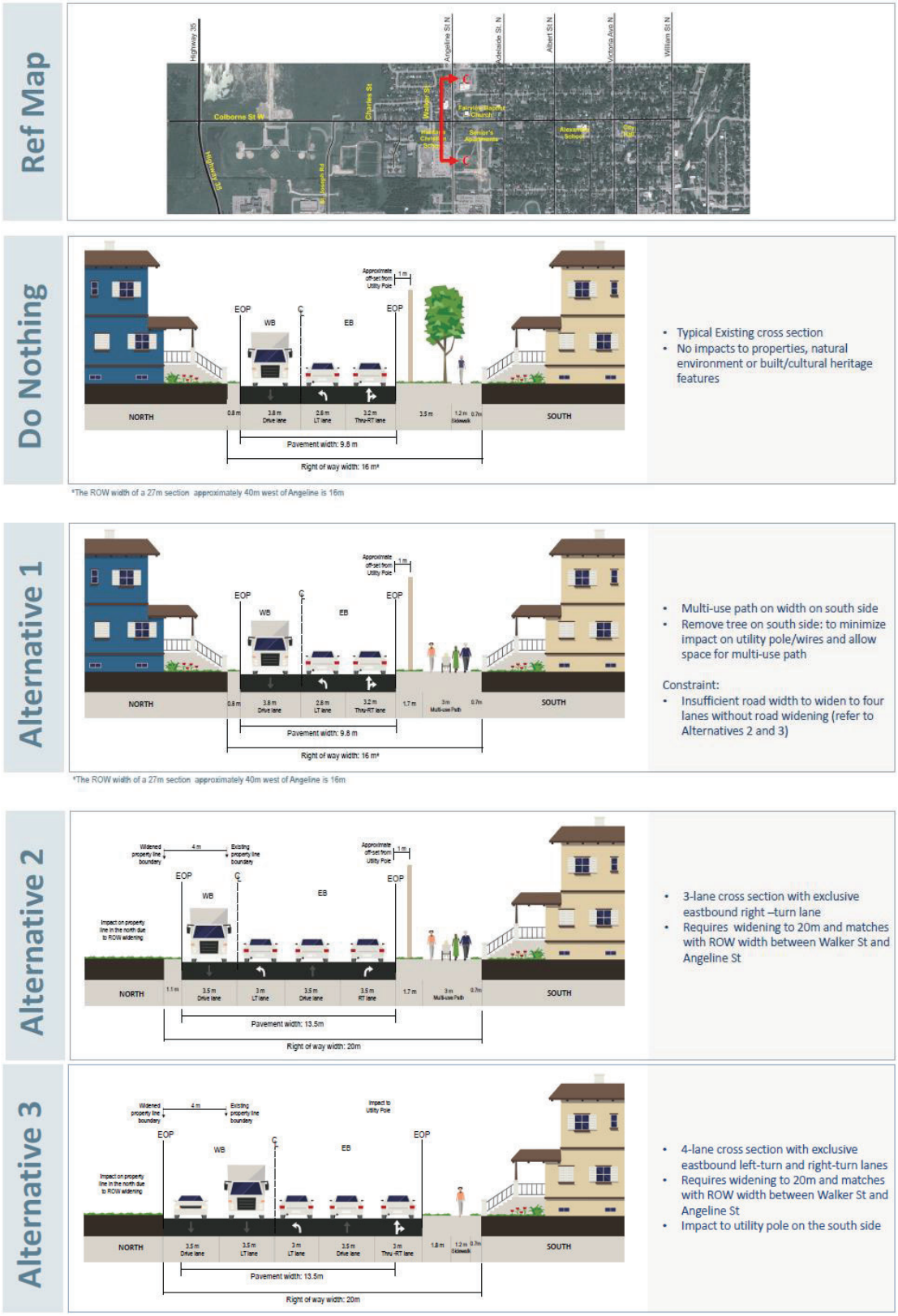


Exhibit 7-3: Segment C: Colborne Street - West of Angeline Street

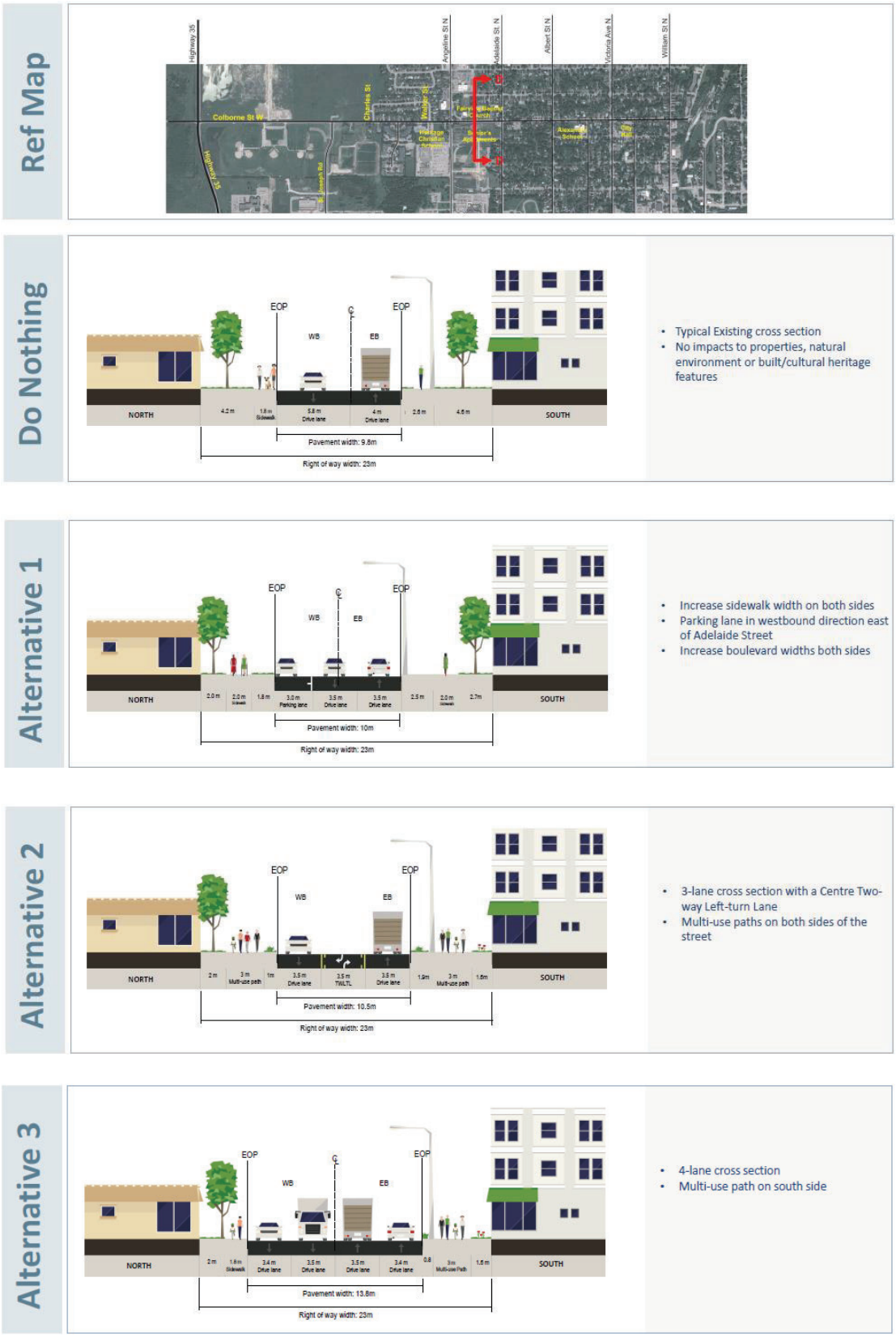


Exhibit 7-4: Segment D: Colborne Street – East of Angeline Street

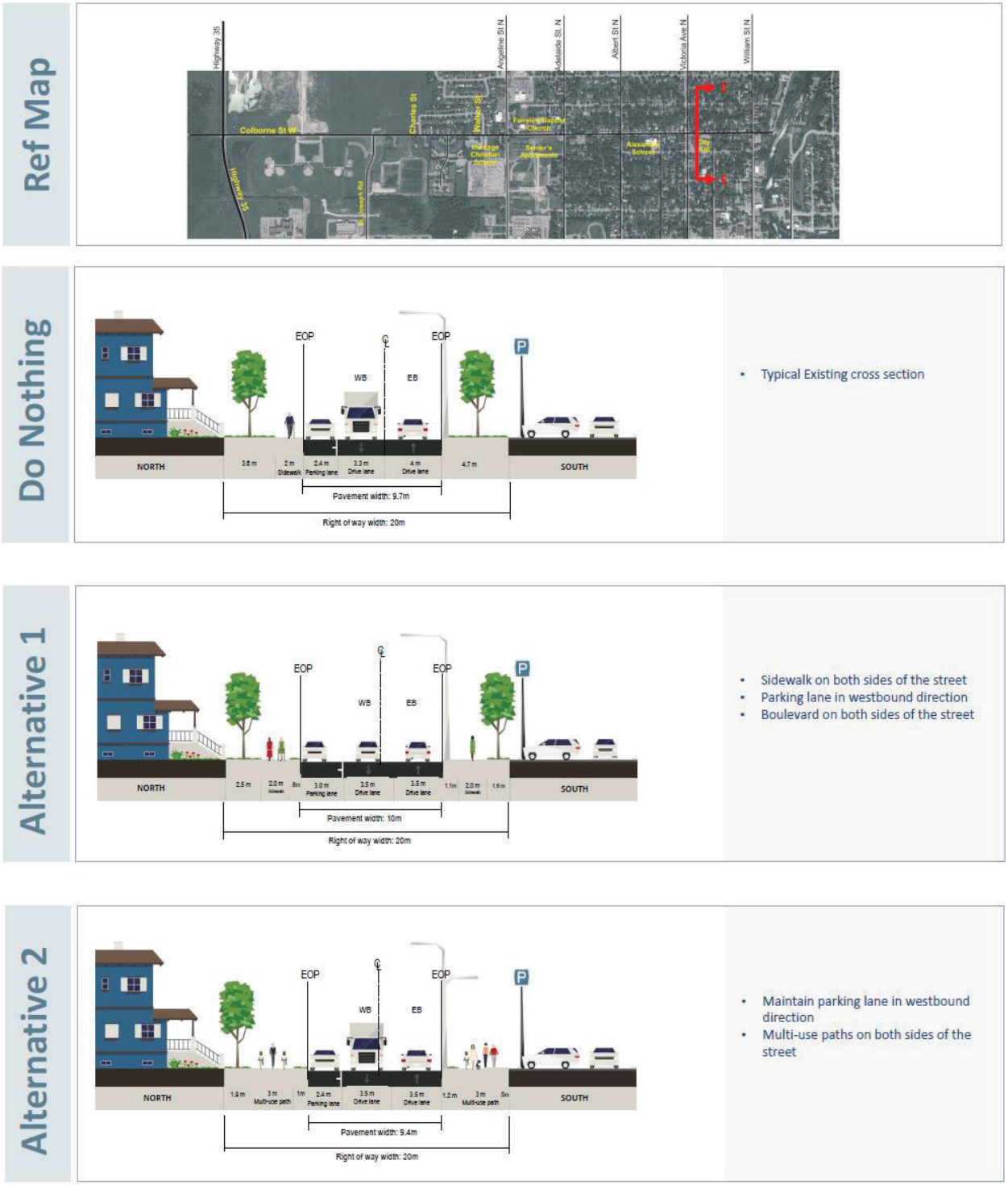
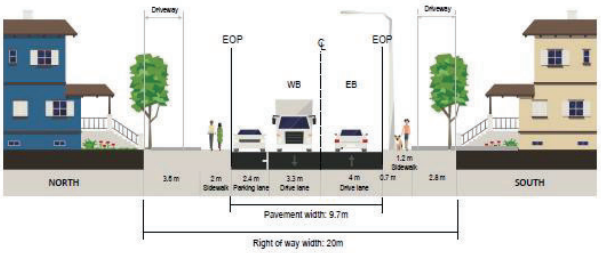


Exhibit 7-5: Segment E1: Colborne Street – East of Victoria Street

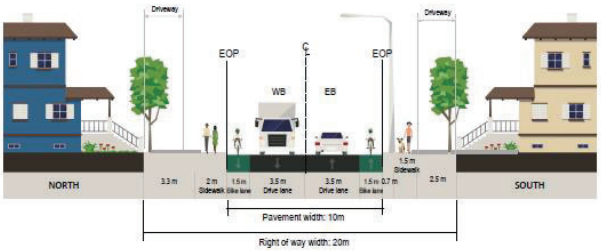
Ref Map

Do Nothing



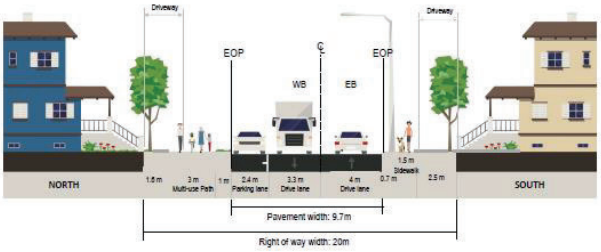
- Typical Existing cross section

Alternative 1



- New 1.5 m sidewalk on south side of the street
- Bike route in both directions

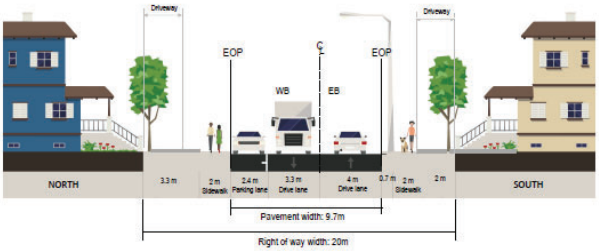
Alternative 2



- Maintain parking lane in westbound direction
- Multi-use path on north side of the street
- 1.5m sidewalk on south side of the street

Constraint:
- Multi-use path on north side may encroach on driveway and front yard
- Although outside of property ROW but multi-use path on south side will encroach on driveway and front yard

Alternative 3



- 2 m sidewalks on both sides of the street

Constraint:
- Sidewalk on south side may encroach on driveway and front yard

Exhibit 7-6: Segment E2: Colborne Street – West of Cambridge Street

Table 7-1: Evaluation of Alternative Cross-Section of Colborne Street (West of St. Joseph)

Criteria	OPTION O Do Nothing	OPTION 1 - Widen to four lanes - New sidewalk on north side (2 m) - Increase south side sidewalk width to 2 m	OPTION 2 - Widen to four lanes - 3-m Multi-use path on both sides
Transportation			
Level of Service and Capacity	▪ Insufficient roadway capacity by 2031	▪ Will accommodate future traffic volumes	▪ Will accommodate future traffic volumes
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard. No sidewalk on north side	▪ Pedestrian accommodation improved through sidewalk widening ▪ Pedestrian accommodation improved on north side with new sidewalk	▪ Pedestrian accommodation improved with multi-use paths ▪ Pedestrian accommodation on north side due to new multi-use path
Accommodation of Cyclists	▪ No change to existing conditions. Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room ▪ Also accommodated on north side	▪ Cycling is accommodated on both sides of the road due to the multi-use paths
Socio-Economic Impacts			
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Accommodation of Planned Development	▪ Cannot accommodate development of NW Quadrant without capacity deficiencies	▪ Can accommodate NW Quadrant	▪ Can accommodate NW Quadrant
Engineering			
Capital and Operating Costs	▪ No costs	▪ Capital cost of less than $1,047,250	▪ Capital cost of approximately $1,047,250
Property Acquisition	▪ No change	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation
- Traffic Safety
- Public Transit Service

Natural Environment
- Vegetation
- Air Quality

Socio-Economic Impacts
- Resident Impacts
- Business Impacts
- Archaeological / Cultural Heritage Resources
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise

Table 7-2: Evaluation of Alternative Cross-Section of Colborne Street (East of St. Joseph Road)

Criteria	OPTION O Do Nothing	OPTION 1 - 3-lane cross-section with centre two-way left-turn lane - Multi-use path on both sides	OPTION 2 - Widen to four lanes - Multi-use path on both sides
Transportation			
Level of Service and Capacity	▪ Insufficient roadway capacity by 2031	▪ Will accommodate future traffic volumes	▪ Will accommodate future traffic volumes
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard	▪ Pedestrian accommodation improved with multi-use paths ▪ Pedestrian accommodation on north side due to new multi-use path	▪ Pedestrian accommodation improved with multi-use paths ▪ Pedestrian accommodation on north side due to new multi-use path
Accommodation of Cyclists	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cycling is accommodated on both sides of the road due to the multi-use paths	▪ Cycling is accommodated on both sides of the road due to the multi-use paths
Public Transit Service	▪ No Impacts	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home
Socio-Economic Impacts			
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new multi-use paths and potential streetscaping	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Engineering			
Property Acquisition	▪ No impact	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts
▪ Traffic Safety	▪ Vegetation ▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development

Table 7-3: Evaluation of Alternative Cross-Section of Colborne Street (West of Angeline Street)

Criteria	OPTION O Do Nothing	OPTION 1 - Maintain 3-lane cross-section - Multi-use path on south side	OPTION 2 - 2-lane cross-section with exclusive turning lanes on Colborne Street - Multi-use path on south side	OPTION 3 - Widen to four lanes - Sidewalk on south side
Transportation				
Level of Service and Capacity	▪ Insufficient roadway capacity by 2031	▪ Insufficient roadway capacity by 2031	▪ Will accommodate future traffic volumes	▪ Will accommodate future traffic volumes ▪ Will invite potentially more through traffic
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard	▪ Pedestrian accommodation improved through provision of multi-use path on south side	▪ Pedestrian accommodation improved through provision of multi-use path on south side	▪ No change to existing conditions. Sidewalk widths are currently substandard
Accommodation of Cyclists	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cyclists will be accommodated on the mutli-use path on the south side	▪ Cyclists will be accommodated on the mutli-use path	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk
Natural Environment				
Vegetation	▪ No impacts	▪ One tree to be removed on the south side	▪ One tree to be removed on the south side	▪ One tree to be removed on the south side
Socio-Economic Impacts				
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ No impacts
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ No impacts
Engineering				
Capital and Operating Costs	▪ No costs	▪ Low cost increase	▪ Relatively high cost increase	▪ Relatively high cost increase
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ More utility relocations will be required	▪ More utility relocations will be required
SUMMARY	**Not Preferred**	**Not Preferred**	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Traffic Safety	▪ Vegetation ▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development	▪ Property Acquisition

Table 7-4: Evaluation of Alternative Cross-Section of Colborne Street (East of Angeline Street)

Criteria	OPTION O Do Nothing	OPTION 1 - Increase sidewalk width to 2.0m on both sides - Maintain parking on north side of street, east of Adelaide Street - Increased boulevard widths	OPTION 2 - Widen to 3-lane cross-section with centre two-way left-turn lane - Multi-use paths on both sides	OPTION 3 - Widen to four lanes - Multi-use paths on south side
Transportation				
Level of Service and Capacity	▪ Roadway will provide poor level of service	▪ Roadway will provide poor level of service	▪ Improved level of service with centre two-way left-turn lane	▪ Improved level of service with widening to four lanes
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard on south side	▪ Pedestrian accommodation improved through sidewalk widening	▪ Pedestrian accommodation improved with multi-use paths	▪ Pedestrian accommodation improved with multi-use path on south side only
Accommodation of Cyclists	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room	▪ Cycling is accommodated on both sides of the road in multi-use paths	▪ Cycling is accommodated on south side of the road in multi-use path
Public Transit Service	▪ No Impacts	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home. South side only.
Natural Environment				
Vegetation	▪ No impacts	▪ One tree to be removed on the south side	▪ Multiple trees may need to be removed on both sides	Multiple trees may need to be removed on both sides
Socio-Economic Impacts				
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use paths and potential streetscaping	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Engineering				
Capital and Operating Costs	▪ No costs	▪ Low cost increase	▪ Intermediate cost increase	▪ High cost increase
Property Acquisition	▪ No impact	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**PREFERRED**	**Not Preferred**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts
▪ Traffic Safety	▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development

Table 7-5: Evaluation of Alternative Cross-Section of Colborne Street (East of Victoria Street)

Criteria	OPTION O Do Nothing	OPTION 1 - Sidewalk on both sides with a width of 2.0m. - Maintain parking on north side of street - Boulevard on both sides of the street	OPTION 2 - Maintain parking lane on north side of the street - Multi-use paths on both sides of the street
Transportation			
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard on south side	▪ New sidewalk provided on south side of road ▪ Sidewalks widened	▪ Pedestrian accommodation improved with multi-use paths on both sides of the road
Accommodation of Cyclists	▪ Sidewalk only provided on the north side of the road	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room	▪ Cycling is accommodated on both sides of the road in multi-use paths
Public Transit Service	▪ No Impacts	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home
Socio-Economic Impacts			
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Engineering			
Capital and Operating Costs	▪ No costs	▪ Low cost increase	▪ Intermediate cost increase
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Traffic Safety ▪ Level of Service and Capacity	▪ Vegetation ▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development	▪ Property Acquisition

Table 7-6: Evaluation of Alternative Cross-Section of Colborne Street (West of Cambridge Street)

Criteria	OPTION O Do Nothing	OPTION 1 - Widen sidewalk on south side (1.5 m), sidewalk on north side to remain (2 m) - Bicycle lanes in both directions	OPTION 2 - Maintain parking lane on north side of the street - Multi-use path on north side - Widen sidewalk on south side (1.5 m)	OPTION 3 - Maintain parking lane on north side of the street - 2 m sidewalks on both sides of the street
Transportation				
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk width on south side is currently substandard	▪ Pedestrian accommodation improved through sidewalk widening on the south side	▪ Pedestrian accommodation improved with multi-use path on north side ▪ Pedestrian accommodation improved through sidewalk widening on the south side	▪ Pedestrian accommodation improved through sidewalk widening
Accommodation of Cyclists	▪ No impacts	▪ Bicycles accommodated in bicycle lanes	▪ Cycling is accommodated on north side of the road in multi-use path	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room
Public Transit Service	▪ No Impacts	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home
Socio-Economic Impacts				
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living ▪ Parking will still be provided on-street	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living ▪ Parking will still be provided on-street
Visual Aesthetics	▪ No change	▪ Improved aesthetics through widened sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use path and wider sidewalk and potential streetscaping	▪ Improved aesthetics through widened sidewalk and potential streetscaping improvement
Engineering				
Capital and Operating Costs	▪ No costs	▪ Intermediate cost increase	▪ Intermediate cost increase	▪ Low cost increase
Property Acquisition	▪ No impacts	▪ No impacts	▪ Multi-use path and sidewalk may encroach on driveways and front yards	▪ Sidewalk on south side may encroach on driveways and front yards
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding multi-use path or sidewalk	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**Not Preferred**	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts
▪ Traffic Safety ▪ Level of Service and Capacity	▪ Vegetation ▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development

7.1.3 Angeline Street at Colborne Street Intersection Improvement

Under future 2031 traffic conditions the additional traffic volumes will result in several movements at this intersection operating well beyond their capacity. Several geometric improvements will be necessary to accommodate the projected 2031 traffic volumes, including widening of Angeline Street from two to four through-lanes in each direction. The necessary intersection improvements are summarized below:

- widening along Angeline Street from a 3-lane cross-section including centre two-way left-turn lane, to 5-lane cross-section including centre two-way left-turn lane
- add exclusive eastbound right-turn lane
- add exclusive westbound right-turn lane

Currently the right-of-way on the west leg of the intersection is too narrow to accommodate the addition of an exclusive eastbound right-turn lane; however, through discussions with the City it appears that the south-west quadrant of the intersection may be redeveloped in the near future, providing the opportunity to purchase land to accommodate this improvement.

Table 7-7: Evaluation of Intersection Improvements (Colborne Street at Angeline Street)

Criteria	OPTION O Do Nothing	OPTION A - Widening along Angeline Street plus intersection improvements along Colborne Street	OPTION B - Widening both Angeline Street and Colborne Street to five lanes
Transportation			
Level of Service and Capacity	▪ Capacity deficiencies and poor level of service	▪ Improved level of service from added capacity along Angeline Street, and for specific movements along Colborne Street	▪ Improved level of service for both Angeline Street and Colborne Street
Traffic Safety	▪ High collisions will continue to occur	▪ Opportunity to address sight line issues and high collisions through re-design of intersection	▪ Opportunity to address sight line issues and high collisions through re-design of intersection
Accommodation of Pedestrians and Cyclists	▪ No sidewalk on north side west of Angeline	▪ Opportunity to incorporate new sidewalk or multi-use path on north side west of Angeline	▪ Opportunity to incorporate new sidewalk or multi-use path on north side west of Angeline
Socio-Economic Impacts			
Institutional and Recreational Facilities Impacts and Access	▪ No impacts	▪ Fairview Baptist Church driveway on Colborne Street may be impacted by the additional westbound right-turn lane but appears as though it can be shifted eastward	▪ Fairview Baptist Church driveway on Colborne Street may be impacted by the additional westbound right-turn lane but appears as though it can be shifted eastward
Residential Impacts	▪ No impacts	▪ Residential homes in the northwest and the apartment on the southeast quadrants will be impacted	▪ Residential homes in the northwest and the apartment on the southeast quadrants will be impacted
Engineering			
Property Acquisition	▪ No impacts	▪ Property will be required on both sides of the road ▪ Property will be required from both sides of the Fairview Baptist Church property to accommodate the westbound right-turn lane as well as the Angeline Street widening ▪ Property will be required form the property on the southwest quadrant of the intersection. Although this property is expected to be redeveloped in the near future	▪ Most property required on both sides of the road ▪ Property will be required from both sides of the Fairview Baptist Church property to accommodate the westbound right-turn lane as well as the Angeline Street widening ▪ Property will be required form the property on the southwest quadrant of the intersection. Although this property is expected to be redeveloped in the near future
Utility Relocation	▪ No impacts	▪ Utilities will have to be moved to accommodate the widening of Angeline Street as well as the additional right-turn lanes along Colborne Street	▪ More utilities will have to be moved to accommodate the widening of Angeline Street as well as the widening of Colborne Street
SUMMARY	**Not Preferred**	**CARRY FORWARD to FUTURE ANGELINE STREET CLASS EA**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Public Transit Service	▪ Vegetation ▪ Air Quality	▪ Archaeological / Cultural Heritage Resources ▪ Visual Aesthetics ▪ Accommodation of Planned Development ▪ Traffic Noise ▪ Business Impacts	▪ Operating Costs ▪ Capital Costs

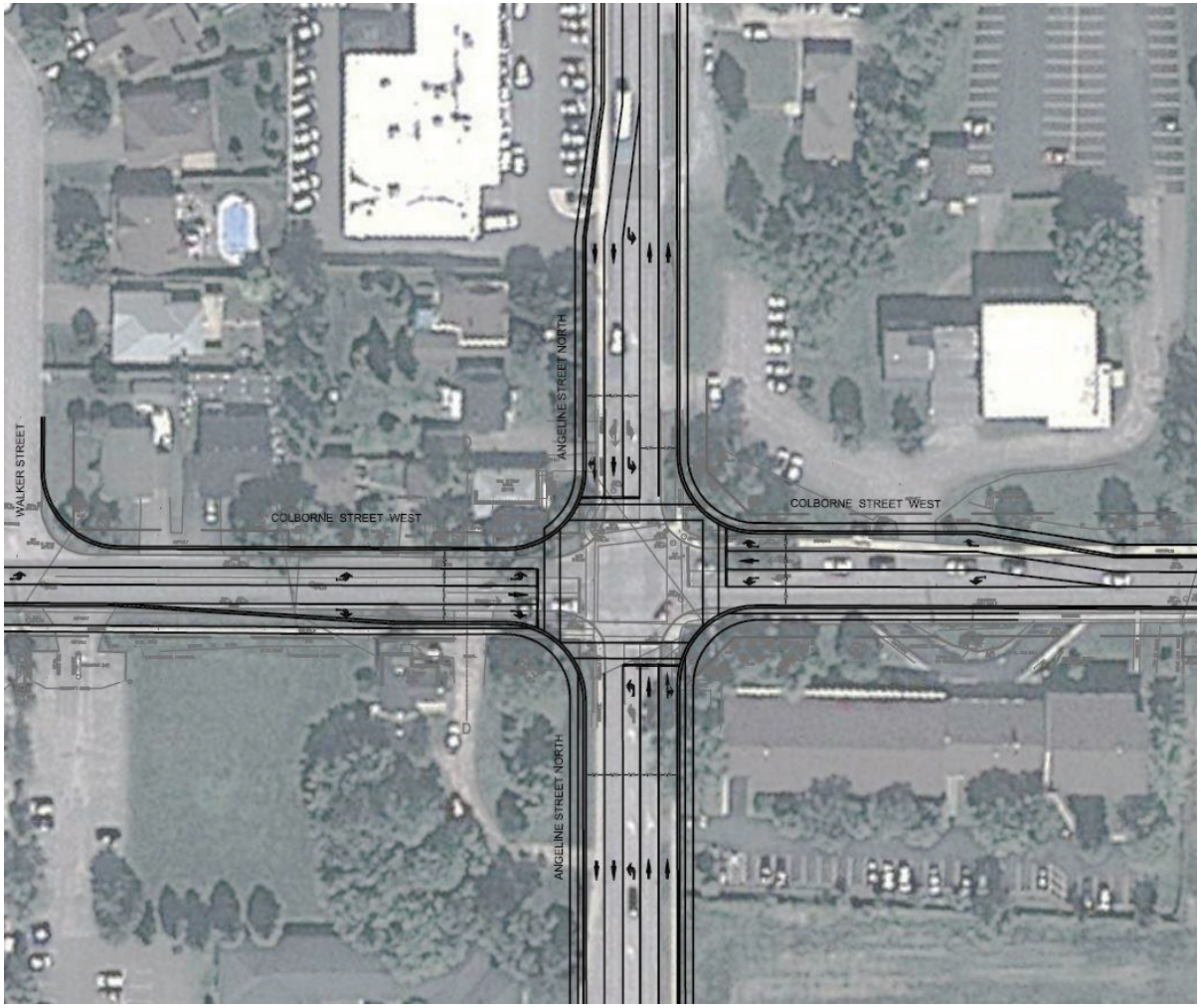


Exhibit 7-7: Conceptual Design of Preferred Colborne Street / Angeline Street Intersection Improvements

7.1.4 Sussex Street Intersection Improvements

There is currently a pedestrian crosswalk on the west side of the intersection which is not signalized; however, a crossing guard supervises the crossing during peak times when student pedestrian volumes are highest (morning and after school). Furthermore, under future 2031 traffic conditions the northbound approach at this intersection will be operating with level of service 'F' and with a volume to capacity ratio well beyond 1.0.

Options for this intersection include signalization to provide acceptable operations and level of service, and also to improve crossing conditions, particularly when a crossing guard is not present. Signalization of this intersection would compete with signalization of the Albert Street intersection due to proximity, and is less preferred since the distance to Victoria Street is only 125 m. If Sussex Street is not signalized with preference to a new signal at Albert Street, then it is likely that vehicles on the northbound approach will utilize Albert Street where level of service for minor approaches will be better. Furthermore, a traffic signal at Albert Street would serve northbound and southbound traffic whereas Sussex Street is a "T" intersection, and thus Albert Street would provide benefit to a higher volume of traffic.

Table 7-8: Sussex Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Conversion to Traffic Signal
Transportation		
Level of Service and Capacity	▪ No impacts	▪ Would produce acceptable operations and level of service; however, spacing to Victoria Street is not ideal.
Traffic Safety	▪ None	▪ Improves safety by providing safe gaps for side street vehicles; however, a signal at Albert street would benefit more vehicles and could divert vehicles from Sussex Street.
Accommodation of Pedestrians	▪ None	▪ Improves safety by providing a safe crossing location and crossing time for pedestrians
Engineering		
Capital Costs	▪ No costs	▪ High
Operating Costs	▪ No costs	▪ Higher
Utility Relocation	▪ No impacts	▪ Some utilities may need to be moved or upgraded
SUMMARY	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists ▪ Public Transit	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition

7.1.5 Albert Street Intersection Improvements

There is currently no pedestrian accommodation at Albert Street. North-south streets are stop-controlled but vehicles along Colborne Street are free-flow. This does not allow for safe north-south crossing. According to discussions with residents and City staff, older students cross at Albert Street in contrast to the younger students at Sussex Street where there is currently a crossing guard during peak times. Furthermore, under future 2031 traffic conditions the northbound and southbound approaches at this intersection will be operating with level of service 'F' and with volume to capacity ratios well beyond 1.0. Options for this intersection include signalization to provide acceptable operations and level of service, and also to facilitate safe crossing. Signalization of this intersection would compete with signalization of the Sussex Street intersection due to proximity.

Table 7-9: Albert Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Conversion to Traffic Signal
Transportation		
Level of Service and Capacity	▪ No impacts	▪ Would produce acceptable operations and level of service
Traffic Safety	▪ None	▪ Improves safety by providing safe gaps for side street vehicles
Accommodation of Pedestrians	▪ None	▪ Improves safety by providing a safe crossing location and crossing time for pedestrians
Engineering		
Capital Costs	▪ No costs	▪ High
Operating Costs	▪ No costs	▪ Higher
Utility Relocation	▪ No impacts	▪ Some utilities may need to be moved or upgraded
SUMMARY	**Not Preferred**	**PREFFERED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists ▪ Public Transit	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition

7.1.6 Highway 35 Intersection Improvements

The intersection of Colborne Street at Highway 35 will have several movements operating with volume to capacity ratios greater than 1.0 and with poor level of service under 2031 conditions. The necessary geometric improvements are listed bellow:

- Separate eastbound left-through-right movement into an exclusive left-turn, and through-right-turn lane.
- Separate westbound left-through-right movement into an exclusive left-turn lane, through lane, and through-right lane. Would be in combination with Colborne Street widening west of St. Joseph Road.
- Additional through lane along Highway 35 in both directions.

Table 7-10: Highway 35 Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Geometric Improvements plus Colborne Street Widening and Highway 35 Widening
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would result in acceptable level of service and volume to capacity ratios
Engineering		
Capital Costs	▪ No costs	▪ High
Property Acquisition	▪ None	▪ Some property may need to be acquired
Operating Costs	▪ Lower	▪ Higher
Utility Relocation	▪ No impacts	▪ Existing utilities may have to be moved
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation

- Accommodation of Pedestrians and Cyclists
- Public Transit
- Traffic Safety

Natural Environment

- Aquatic Habitat
- Surface Water
- Vegetation
- Air Quality

Socio-Economic Impacts

- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Accommodation of Planned Development
- Business Impacts
- Visual Aesthetics
- Archaeological / Cultural Heritage Resources

7.1.7 William Street Intersection Improvements

The intersection of Colborne Street at William Street will have several movements operating with volume to capacity ratios greater than 1.0 and with poor level of service. Currently, all approaches have shared left-through-right turn lanes. The necessary geometric improvements are listed below, and would be required in combination with signalization of the intersection:

- Eastbound and westbound approaches: left-through lane, plus right-turn lane.
- Northbound and southbound approaches: exclusive left-turn lanes with storage, plus shared through-right turn lane.

Table 7-11: William Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Signalization plus Geometric Improvements
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would result in acceptable level of service and volume to capacity ratios
Engineering		
Capital Costs	▪ No costs	▪ High
Property Acquisition	▪ None	▪ Some property may need to be acquired
Operating Costs	▪ Lower	▪ Higher
Utility Relocation	▪ No impacts	▪ Existing utilities may have to be moved
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation

- Accommodation of Pedestrians and Cyclists
- Public Transit
- Traffic Safety

Natural Environment

- Aquatic Habitat
- Surface Water
- Vegetation
- Air Quality

Socio-Economic Impacts

- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Accommodation of Planned Development
- Business Impacts
- Visual Aesthetics
- Archaeological / Cultural Heritage Resources

7.1.8 Victoria Street Intersection Improvements

The intersection of Colborne Street at Victoria Street will operate with the eastbound approach operating with a volume to capacity ratio of 1.0 and the northbound left-turn operating with level of service 'F'. Separation of the eastbound left from the through-right movement, by providing an exclusive eastbound left-turn lane would mitigate these deficiencies. Since the cross-section of Colborne Street in this section includes a parking lane, part of the parking lane could be used to accommodate the left-turn lane.

Table 7-12: Victoria Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Add Eastbound Left-turn Lane
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would result in acceptable level of service and volume to capacity ratios
Engineering		
Capital Costs	▪ No costs	▪ Low
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation

- Accommodation of Pedestrians and Cyclists
- Public Transit
- Traffic Safety

Natural Environment

- Aquatic Habitat
- Surface Water
- Vegetation
- Air Quality

Socio-Economic Impacts

- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Accommodation of Planned Development
- Business Impacts
- Visual Aesthetics
- Archaeological / Cultural Heritage Resources

Engineering

- Property Acquisition
- Operating Costs
- Utility Relocation

7.1.9 Cambridge Street Improvements

The intersection of Cambridge Street at Colborne Street will operate with the minor northbound approach operating with level of service 'F' and a volume to capacity ratio above 1.0, if the traffic signal at William Street is not installed. However, if the William Street traffic signal is installed, the volume to capacity ratio for the northbound approach at Cambridge Street will be less than 1.0, and level of service will be acceptable, due to the forced gaps in traffic along Colborne Street as a result of the signal to the east.

Furthermore, northbound left-turning vehicles at this intersection are projected to be in the magnitude of 164 vehicles per hour; over 100 of which are new vehicle volumes on top of the existing condition and a large majority are comprised of vehicles by-passing the intersection of William Street and Colborne Street (refer to **Section 6.1.5**) and using Cambridge Street as an alternative. If only 60 of these new vehicles were diverted to the signalized intersection at Victoria Street, then the northbound approach at both Victoria Street and Cambridge Street would be operating with acceptable level of service and with volume to capacity ratios of less than 1.0. It seems very likely that the minor street approach volumes at this intersection are exaggerated due to the reassignment discussed in **Section 6.1.5** and that diversion to Victoria Street is very plausible considering the remaining capacity for that movement.

Assuming the William Street traffic signal is not installed and northbound left-turning vehicles are not diverted to Victoria Street, the potential mitigation measures include signalization. Signalization is not ideal due to proximity to Victoria Street.

Table 7-13: Cambridge Street Improvements

Criteria	OPTION O Do Nothing	OPTION A Signalization
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes unless there is diversion to Victoria Street	▪ Would improve level of service and volume to capacity ratios for northbound approach. Spacing to Victoria Street is not ideal. It is likely that northbound left-turns would be diverted to Victoria Street where there will be capacity.
Engineering		
Capital Costs	▪ No costs	▪ Higher
SUMMARY	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists and Pedestrians ▪ Public Transit ▪ Traffic Safety	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition ▪ Operating Costs ▪ Utility Relocation

7.1.10 Walker Street Improvements

The intersection of Walker Street at Colborne Street will operate with the minor southbound approach operating with level of service 'F' and a volume to capacity ratio above 1.0. Potential mitigation measures include provision of a centre two-way left-turn lane along Colborne Street to allow for two-stage left-turns from the minor street onto Colborne Street.

Table 7-14: Walker Street Improvements

Criteria	OPTION O Do Nothing	OPTION A Geometric improvements to provide a centre two-way left-turn lane
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would improve level of service and volume to capacity ratios for northbound approach
Engineering		
Capital Costs	▪ No costs	▪ Low
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists and Pedestrians ▪ Public Transit ▪ Traffic Safety	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development	▪ Property Acquisition ▪ Operating Costs ▪ Utility Relocation

	▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources

7.1.11 Heritage Way Improvements

The intersection of Heritage Way at Colborne Street will operate with the minor northbound approach operating with level of service 'F' and a volume to capacity ratio above 1.0. Potential mitigation measures include provision of a centre two-way left-turn lane along Colborne Street to allow for two-stage left-turns from the minor street onto Colborne Street.

Table 7-15: Heritage Way Improvements

Criteria	OPTION O Do Nothing	OPTION A Geometric improvements to provide a centre two-way left-turn lane
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would improve level of service and volume to capacity ratios for northbound approach
Engineering		
Capital Costs	▪ No costs	▪ Low
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists and Pedestrians ▪ Public Transit ▪ Traffic Safety	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition ▪ Operating Costs ▪ Utility Relocation

7.1.12 Transit Network Improvements

As discussed in **Section 3.2.2**, the current transit network is comprised of three routes shown in **Exhibit 3-5** (Green, Blue, and Red) which weave through the Town to provide as much coverage to the entire Town as is possible without adding additional routes. One drawback of this is that the headways are long (1 hour) for each route, not including route overlaps, and there is no direct east-west service.

North of Colborne Street only the Green Route provides service, while east of the Scugog River, service is only provided by the Blue Route. Since the routes weave so much to cover as much area as possible, there may be opportunities to improve the routes or to provide a new route with higher frequency and more direct service. This may be practical under existing conditions, given the ridership, but in the future it is likely that new routes and an increased fleet size would be appropriate especially considering new development in the Jennings Creek Development Plan Area north of Colborne and west of St. Joseph Road.

A new route option, shown in **Exhibit 7-8**, would provide much more direct service with a higher frequency and lower headway and would help link the Town to the commercial area along Kent Street near St Joseph Road as well as the planned commercial area north-west of Colborne Street / St Joseph Road.

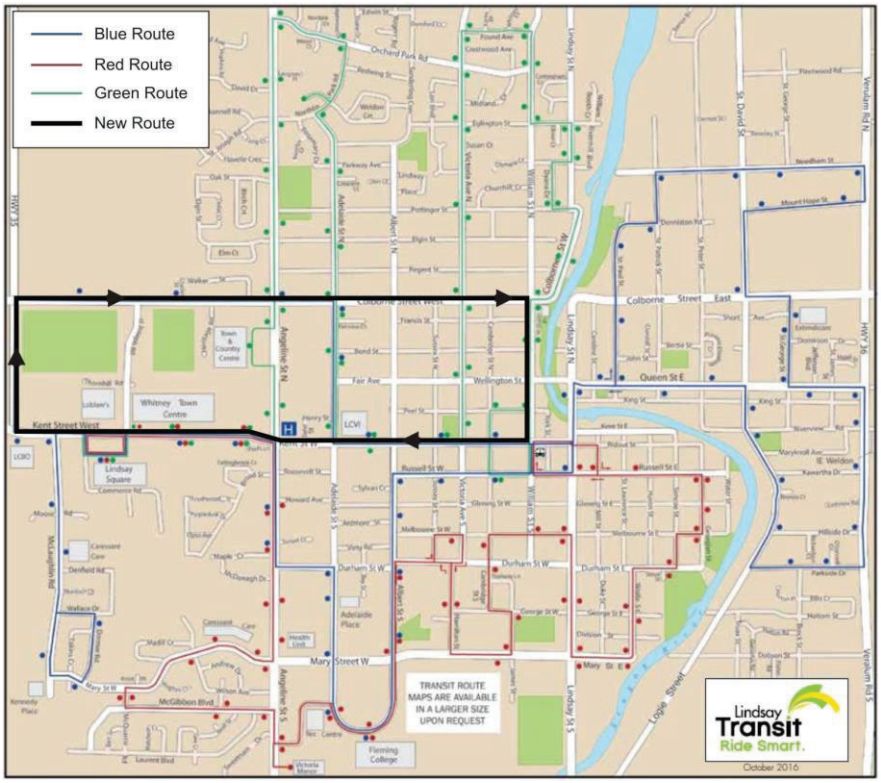


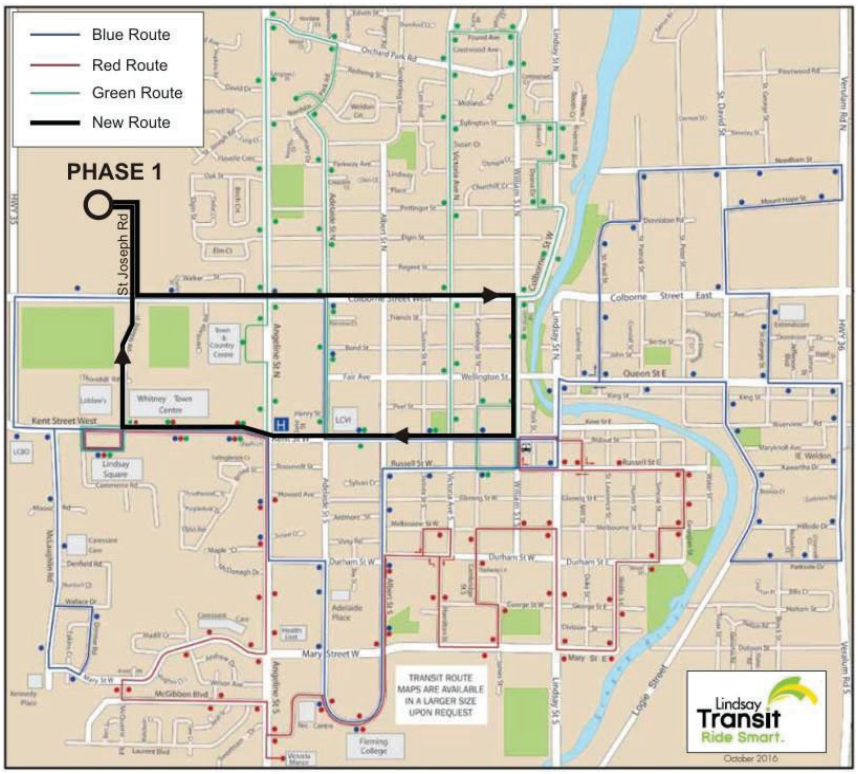
Exhibit 7-8: Potential New Bus Transit Loop Service

Existing routes could also be extended to provide connectivity to other transit services such as Peterborough GO.

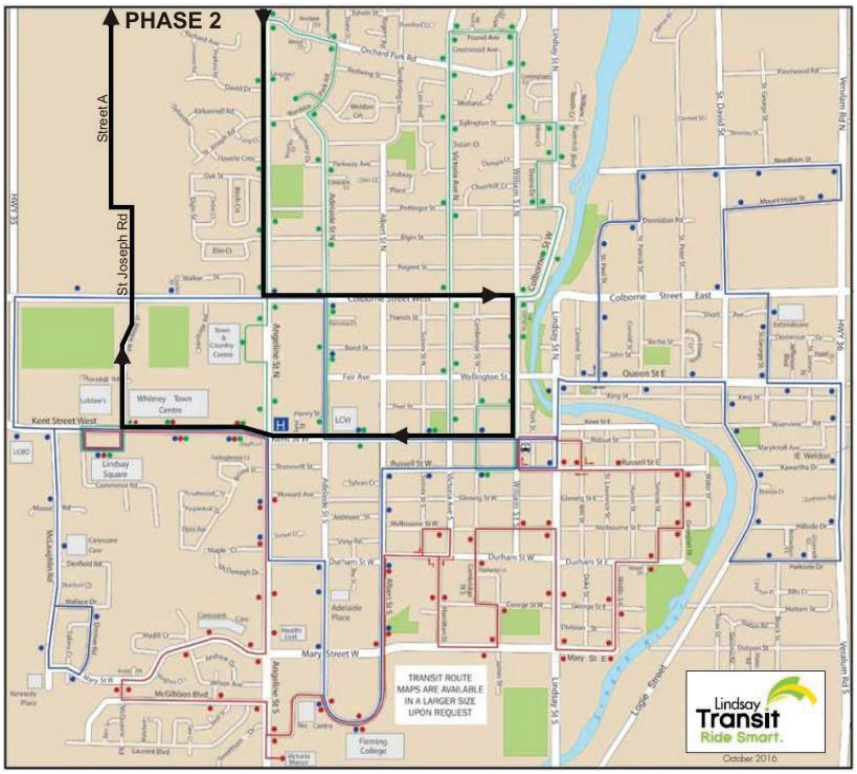
Given the planned commercial node to the north-west of the Colborne Street / St Joseph Road intersection, as well as the new residential development planned within the Jennings Creek Development Plan Area, there is also opportunity to extend the new route to the north to serve these development areas, while maintaining a more direct route structure that will provide more frequent service overall and primarily serve the core area (Colborne Street and Kent Street).

Since the commercial area will be developed before the remainder of Jennings Creek, the new route could be phased as shown in **Exhibit 7-9** with Phase 1 looping back within the commercial node. Phase 2 could continue through the commercial area, travel north along Street A to Jennings Creek SPA and loop back along Angeline Street.

The opportunity to expand transit goes beyond this corridor study and the EA process as a long term transit improvement and should be a city-wide strategic initiative that could be further explored within a Transit Strategy or Transit Master Plan, and would require further discussions with the Transit Board. Furthermore, since the ultimate street network layout for the Jennings Creek SPA is not yet determined, a more detailed study into the opportunities for connecting transit to the Jennings Creek SPA should be undertaken once the road fabric is determined.



Phase 1 (Commercial Area Loop)



Phase 2 (Jennings Creek SPA Route Extension)

Exhibit 7-9: Potential New Bus Transit Loop Service to Jennings Creek SPA

8 CONSULTATION

The consultation process and public input are key components of the Municipal Class EA process and is summarized in this section of the report. Consultation events and activities for the Colborne Street Schedule B Class EA and Corridor Study and the Kent Street Schedule B Class EA and Corridor Study were undertaken jointly. Additional details on the consultation process are contained in **Appendix B.**

8.1 Study Schedule

The study was initiated in August 2013. Key dates in the study were as follows:

- Notice of Study Commencement — September 5th, 2013
- First Stakeholder Meeting — September 17th, 2013
- First Public Open House — September 24th, 2013
- Second Stakeholder Meeting — November 28th, 2013
- Second Public Open House — December 5th, 2013
- Notice of Study Completion — November 2016
- Project File Report on Public Record — December 2016

8.2 Summary of Public Consultation Process

Consultation is a key aspect of the EA process. The ***Municipal Class Environmental Assessment*** (October 2000, as amended in 2007, 2011 and 2015) specifies the requirements for consultation for the various classes of EA. Under the ***Municipal Class Environmental Assessment***, the proponents of Schedule B Class EAs are required to conduct consultation at two points during the EA process:

- at the end of Phase 2 allowing the public and stakeholders the opportunity to provide input on the problem/opportunity and alternative solutions; and
- at the completion of the EA to allow the public and stakeholders to review the completed EA.

As per the ***Municipal Class Environmental Assessment***, each stage of consultation identified above is to be advertised by the publication of a Notice to the public. For Schedule B Class EAs, two published Notices are required for each

stage of consultation: a Notice of Commencement for the first stage; and a Notice of Completion for the second stage.

The City of Kawartha Lakes conducted a consultation program that exceeded the requirements of the ***Municipal Class Environmental Assessment*** including the required notifications, two public consultation events, and stakeholder meetings. The consultation program for the EA included the following components.

- **Newspaper advertisements** – The Notice of Study Commencement & Public Open House was published in the **Kawartha Lakes This Week** newspaper on September 5th, 2013 to announce the commencement of the EA and to invite interested members of the public to attend the first Public Open House. A Notice of Public Open House was published in the **Kawartha Lakes This Week** newspaper on November 28th, 2013 to invite interested members of the public to the second Public Open House. These public notices are provided in **Appendix B.**
- **Project e-mail mailing list –** Residents and interested parties who provided a valid e-mail address at Public Open House #1 or at other points during the study were added to the project e-mail mailing list. The Public Open House and Stakeholder notices were distributed to this e-mail list.
- **Telephone calls –** Two telephone numbers were provided on all newspaper advertisements and on comment sheets to allow members of the public to contact the project team; one number for the City's Project Manager and the other for the Consultant Project Manager.
- **City of Kawartha Lakes website** – The public was invited in the Notices and on all comment sheets to visit the City's website. An e-mail address was also provided for the City's project manager. The website was used to provide updated information on the project, information from the Public Open Houses and stakeholder meetings, and notification of upcoming Public Open Houses and meetings.
- **Two Stakeholder Meetings** – These meetings were held at the City of Kawartha Lake's Public Works offices (12 Peel Street) on September 17th, 2013, and November 28th, 2013. These meetings were staffed by members of the consultant team and City staff. Both meetings consisted of a presentation to the stakeholders by the Consultant as well as discussion on the presentation content. Representatives from the project team were in attendance to answer questions about the study and findings to date. Attendees were asked to sign-in. Stakeholder meeting summaries and display materials are provided in **Appendix B**.
- **Two Public Open Houses** – These meetings were held at City Hall on September 24th, 2013 and December 5th, 2013. These meetings were staffed by members of the consultant team and City staff. These meetings consisted of an informal Public Open House with display panels, where the public could ask questions of the project team on the display panels or on any other study

related topic. The second Public Open House was conducted in the same format with updated display panels reflecting the study progress to date. Representatives from the project team were in attendance to answer questions about the study. As attendees entered the Public Open Houses they were asked to sign-in and were provided with comment forms. These forms provided them with an opportunity to present their feedback on the study and to ask any additional questions. The forms were either dropped off in a comment box or emailed or mailed after the meeting to the City and Consultant Team. Public Open House materials are provided in **Appendix B**.

8.3 Stakeholder and Agency Participation

A list of stakeholders, including public agencies and adjacent landowners, was prepared at the project initiation. Each party on the list of stakeholders was contacted for information or comments. The opportunity for these stakeholders to participate in the project was provided through the notice of study commencement, through announcement of two Stakeholder Meetings, and two Public Open Houses. The following is a summary of the agencies and stakeholders contacted.

Agencies and Authorities

- City of Kawartha Lakes Engineering Services
- City of Kawartha Lakes Planning
- City of Kawartha Lakes Police Services
- City of Kawartha Lakes Fire Services
- City of Kawartha Lakes Clerks Department
- City of Kawartha Lakes Public Works
- City of Kawartha Lakes Accessibility Committee
- City of Kawartha Lakes Development Services
- City of Kawartha Lakes Economic Development
- City of Kawartha Lakes Council Members
- Ontario Ministry of Transportation, East Region
- Haliburton Kawartha Pine Ridge (HKPR) District Health Unit
- Infrastructure Ontario

Landowners / Businesses

- Lindsay Chamber of Commerce
- Lindsay Downtown BIA
- Lindsay Square
- Mason Homes
- Loblaws
- LaSalle Investment Management
- J. Stollar Construction Limited
- The Hi-Rise Group
- Osler, Hoskin & Harcourt
- Canadian Tire
- Boston Pizza
- Counterpoint

Agencies and stakeholders will also be provided another opportunity to review and comment on the EA during the Notice of Completion review period. Key correspondences with agencies and stakeholders are provided in **Appendix B**.

8.4 Correspondence with Indigenous Groups

Indigenous Groups who may have an interest in the study were contacted by e-mail or telephone. The Indigenous Group contact list and correspondence with Indigenous Groups are provided in **Appendix B.**

No questions, comments, issues or concerns have been raised by the Indigenous groups to-date.

The following Indigenous groups were contacted:

- Alderville First Nation;
- Beausoleil First Nation;
- Chippewas of Georgina Island;
- Chippewas of Rama First Nation;
- Curve Lake First Nation;
- Hiawatha First Nation;
- Kawartha Nishnawbe First Nation;
- Metis Nation of Ontario;
- Mississaugas of the New Credit First Nation;
- Northumberland Metis Council;
- The Mississaugas of Scugog Island; and
- Williams Treaty First Nation.

8.5 Stakeholder Meetings and Public Open Houses

The public consultation process involved the following events:

Meetings with Stakeholders

Two stakeholder meetings were held on September 17th and November 28th, 2013. The purpose of the meetings was to introduce and present to the stakeholders the existing conditions on Colborne Street, the opportunities and challenges for the study, and to discuss stakeholder concerns about the Colborne Street and Kent Street Schedule B Class EAs and Corridor Studies. The meetings were structured around a presentation by the consultant in a boardroom setting, followed by an open discussion and question and answer period.

A summary of the concerns identified is documented in **Section 8.6**. Summaries of these meetings are provided in **Appendix B**.

Public Open House #1 (POH#1)

The first Public Open House (POH#1) was held on Tuesday September 24th, 2013 at City Hall. The purpose of POH#1 was to present members of the community with an introduction to the project, the existing conditions, and to receive feedback. The format was an informal open house from 3:30pm to 6:30pm. A presentation was given, followed by a question and answer period. Representatives from the City of Kawartha Lakes and the project team were also in attendance.

The public was notified of POH#1 by advertisements published in the local newspaper and a notice on the City's website. The advertisements informing the public of the Study Commencement and POH#1 were placed in the **Kawartha Lakes This Week** newspaper on September 5th, 2013. Public agencies and stakeholders were also notified of the study by letter, email or phone call.

Upon arrival at the POH#1, attendees were asked to sign a visitor registration sheet. Four comment sheets were collected.

Twenty panels were displayed. The information panels included the following:

- Welcome;
- Study Area and Study Objectives;
- Study Background;
- Municipal Class Environmental Assessment Process;
- Existing Conditions;
- Problem Statement;
- Next Steps; and
- Contact Information.

A copy of the POH#1 display panels were posted to the project website after the Public Open House. Drawings showing the existing conditions survey of the study area, and existing aerial photography of the study area were also shown.

Public Open House #2 (POH#2)

The second Public Open House (POH#2) was held on December 5th, 2013, also at City Hall. The purpose of POH#2 was to present members of the community with future conditions, preliminary alternatives and findings, and to receive feedback. The format was an informal Public Open House from 5:00pm to 8:00pm, with residents observing the boards and asking questions of the consultant and City staff.

The public was notified of POH#2 by advertisements published in the **Kawartha Lakes This Week** newspaper on November 28th, 2013 and a notice on the City's website. Agencies and stakeholders were also notified of the study by letter, email or phone call.

Upon arrival at POH#2, attendees were asked to sign a visitor registration sheet. Five comment sheets were collected.

Twenty-eight panels were displayed. The information panels included the following:

- Welcome;
- Study Area and Study Objectives;
- Study Background;
- Municipal Class Environmental Assessment Process;
- Existing Conditions;
- Public Input from POH#1;
- Problem Statement;
- Future Traffic Operations;
- Alternatives;
- Evaluation Criteria;
- Next Steps; and
- Contact Information.

A copy of the POH#2 display panels were posted to the City's website after the Public Open House. Drawings showing the existing conditions survey of the study area, and existing aerial photography of the study area were also shown.

A summary of issues and questions received from the public is documented in **Section 8.6**. The complete summary of both Public Open Houses, including the Project Team's responses is provided in **Appendix B**.

8.6 Public and Stakeholder Comments

The consultant team compiled comments and questions received from the public and stakeholders via comment sheets, verbal questions, letters, e-mails, and telephone calls. The comments received and responses are provided in **Appendix B**. Key public comments received via Public Open Houses and Stakeholder Meetings are summarized as follows:

Principle comments raised by the public during both Public Open Houses include:

- **Colborne Street Corridor**

- Pedestrian safety (students and seniors). J-walking is prevalent;
- Reduce conflict points;
- Traffic signal at Adelaide Street is “not working”;
- Town Hall has parking issues, specifically for staff and events; and
- Measures which the public thought could help included: more pedestrian crossings, increased police presence, and traffic calming measures.

- **Queen Street Bridge** – Existing capacity deficiencies; some people indicated the need for another crossing to the north; capacity deficiencies are short lived throughout the day.
- **Transit** – The public generally agreed that transit service was insufficient, especially inter-city.

Principal comments raised by stakeholders during both Stakeholder Meeting #1 and Stakeholder Meeting #2 include:

- **St. Joseph Road Extension** – Stakeholders expressed concerns that the St. Joseph Road extension to the north of Colborne Street would not be utilized at its full capacity, thus furthering the potential for blight in the west commercial area on Kent Street.
- **Future Road Network** – Stakeholders expressed general concerns with the approved road improvements, versus those which had not yet been approved. The St. Joseph Road extension was a major contributor to this concern, as well as the general future road layout in the currently vacant lands between Highway 35 and Angeline Street, north of Colborne Street. It was agreed that St. Joseph is to be extended to the north towards Angeline Street, as a collector roadway.
- **Scugog River Bridge** – Stakeholders expressed concerns that the future traffic volumes projected using the Scugog River bridge, and nearby roads, were too high, and not reflective of the projected land uses to the east of the river. It was agreed that a bridge could be assumed at the Thunderbridge Road location, to determine if the bridge would mitigate future capacity deficiencies at the existing bridge (Queen Street).
- **Active Transportation –** Stakeholders agreed that active transportation network needed improvements to facilitate travel to and from the west commercial area and the downtown area. Dedicated bike lanes on Kent Street may not be the best option though given the traffic volumes. The opportunity to accommodate active transportation needs could be better on Colborne.

The above comments and issues were considered in the analysis and evaluation of alternative solutions for the Colborne Street corridor.

8.7 Notice of Completion

The last component of the Consultation for an EA is the Notice of Completion. A Notice of Completion is issued to identify completion of the Class EA and is mailed to anyone who expressed an interest in the study.

Under the *Environmental Assessment Act*, members of the public, interest groups, agencies, and other stakeholders may submit a written request to the Minister of the Environment to require the proponent (the City of Kawartha Lakes) to comply with Part II of the *Environmental Assessment Act* before proceeding with the proposed undertaking.

By requesting a Part II Order the public or agencies may request the Minister of the Environment to elevate the project to a Schedule C project or an Individual EA. The request for a Part II order must also be copied to the proponent at the same time it is submitted to the Minister. As per the ***Municipal Class Environmental Assessment***, written requests for a Part II order must be submitted to the Minister within the 30-calendar day review period after the proponent has filed the Project File Report and has issued the Notice of Completion of the Project File Report. As previously noted, the City of Kawatha Lakes is voluntarily extending the review period to 45 calendar days. Requests received after the 45-calendar day review period will not be considered.

If no new or outstanding concerns are brought forward during the review period, the City of Kawartha Lakes may complete detail design and construction of the preferred solutions.

9 SELECTION OF PREFERRED ALTERNATIVE

9.1 Description of Preferred Solutions for Colborne Street

Based on the analysis of existing and future traffic conditions, the evaluation of alternatives and design concepts, and the consideration of existing constraints, the preferred solution for the Colborne Street corridor will be to:

- widen to four through-lanes from Highway 35 to east of St. Joseph Road, with multi-use paths on both sides of the road;
- transition to a 3-lane cross-section with centre two-way left-turn lane west of Charles Street, with a multi-use path on the south side of the road;
- maintain the 3-lane cross-section to Angeline Street with the centre two-way left-turn lane becoming an exclusive eastbound left-turn lane at Angeline Street, and also provide an exclusive eastbound right-turn lane and a multi-use path on the south side;
- provide a 2-lane cross-section from Angeline Street to William Street, widen sidewalks on both sides of the road and provide a new sidewalk on the south side of the road between Victoria Avenue and Cambridge Street, increase boulevard, and maintain a parking lane on the north side of the road from Adelaide Street continuing to the east;
- separate the eastbound left-turn lane at the intersection of Victoria Street, which should be able to be accomplished through restriping;
- install a new traffic signal at Albert Street;
- undertake geometric improvements at William Street intersection including installation of a new traffic signal;
- coordinate geometric improvements at the intersection of Colborne Street and Highway 35 with the Mason Homes / Jennings Creek Traffic Impact Study, including potential widening of approaches on Highway 35 and Colborne Street to 4-lane cross-sections; and,
- improve transit service in line with future development (including Jennings Creek Development Plan Area) and coordinate improvements through a town-wide or city-wide Transit Strategy or Transit Master Plan.

The proposed solution to improve the operations to the intersection of Colborne Street at Angeline Street involves the widening of Angeline Street from two lanes to four travel lanes in each direction. Due to the overlap, these improvements would have to be considered in a separate EA for the widening of Angeline Street intersection and therefore pending the results of the Angeline Street EA, the ultimate intersection configuration to meet 2031 demands cannot be finalized.

Recommendations are summarized in **Exhibit 9-1**.

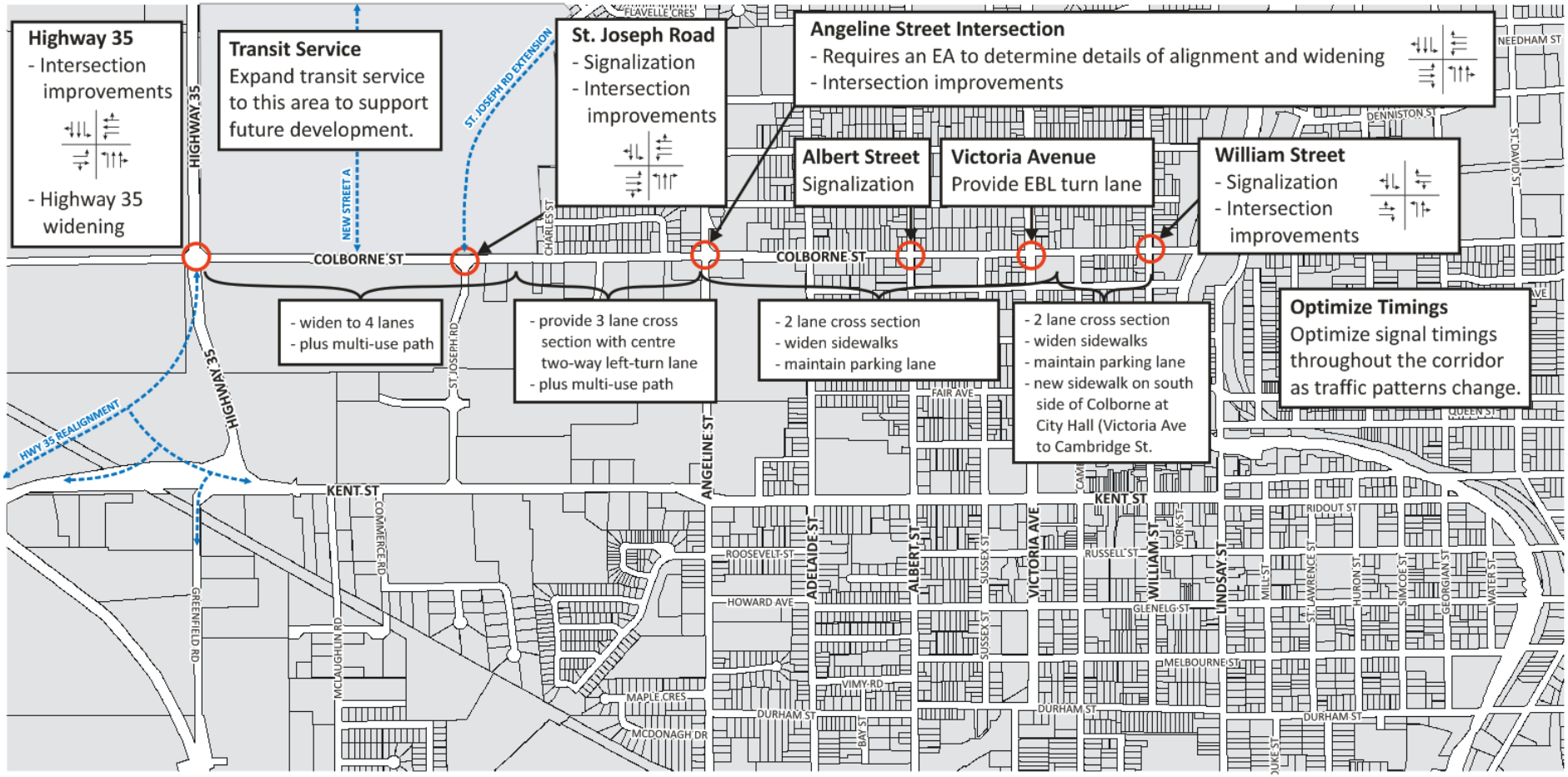


Exhibit 9-1: Recommended Road Network Improvements for Colborne Street

9.1.1 Property Requirements

No significant property requirements are identified to implement the preferred solutions for the Colborne Street corridor as most of the proposed work is anticipated to occur within the existing road right-of-way with the exception of west of Angeline Street where additional property may be required due to a bottleneck in the right-of-way, and also due to the construction of intersection improvements at Colborne/Angeline. Property impacts and requirements are to be reviewed and confirmed during detail design and the future Angeline Street EA.

9.1.2 Timing of Improvements

The proposed solutions cannot all be implemented at once and a potential schedule for implementation is provided below based on categorizing the improvements to short term (0-5 years) and medium to long term (beyond 5 years) timeframes.

Short Term 0-5 years

- Increase existing sidewalk widths 2 m along the entire corridor east of Angeline Street.
- Implement new sidewalk on south side in the vicinity of City Hall.
- Add eastbound left-turn lane at Victoria Street.
- Protect for future traffic signals where the need has been identified and monitor for warrants (St. Joseph Road, William Street, Albert Street).
- Improve transit service on Colborne Street in line with future development in the northwest (Mason Homes and Jennings Creek) and coordinate improvements through a town-wide or city-wide Transit Strategy or Transit Master Plan.
- Optimize signal timing plans and increase cycle lengths where necessary and as required by monitoring.
- Carry out Angeline Street Widening EA.

Medium-Long Term: Beyond 5 Years

- As development north of Colborne and west St. Joseph Road occurs, install a traffic signal at the intersection of St. Joseph Road and Colborne Street and widen Colborne Street to four lanes between Highway 35 and west of Charles Street. At the same time, convert the section between west of Charles Street and just west of Angeline Street to a 3-lane cross-section with centre two-way left-turn lane. Also provide multi-use paths from Highway 35 to Angeline Street.
- Signalize intersections previously protected for signalization (William Street, Albert Street).

- Coordinate with MTO for widening of Highway 35 to a 4-lane cross-section.

The City will review and confirm the timing of the improvements based on their capital budget processes and based on discussions with adjacent landowners.

9.1.3 Preliminary Cost Estimate

Cost estimates for major items are provided below. Not all improvements will result in capital costs.

Improvement	Cost Estimate
Widening of Colborne Street from Highway 35 to west of Charles Street plus installation of multi-use path	$1,047,250
Install new traffic signal at St. Joseph Road / Colborne Street Intersection plus geometric improvements	$247,750
Install new traffic signal at Albert Street / Colborne Street	$173,500
Install new traffic signal at William Street / Colborne Street Intersection plus geometric improvements	$305,000
Restriping between west of Charles Street and Angeline Street to provide centre two-way left-turn lane	$10,000
Restriping to provide eastbound left-turn lane at Victoria Street	$5,000
Colborne / Angeline Intersection Improvements	$420,000
2.0 m sidewalk east of Angeline Street (excludes any costs for potential streetscaping or utility relocation)	$159,500
Total	**$2,368,000**

Notes: Includes contract administration, contingency, and engineering and excludes property acquisition costs.

9.2 Environmental Effects and Mitigation Measures

9.2.1 Summary of Identified Concerns and Mitigation Measures

The road improvement construction activities to implement these solutions are to occur within the City's existing road right-of-way; however temporary construction easements may be required to facilitate the construction. Temporary construction easements will be minimized to the greatest extent possible. Any areas disturbed as part of the construction that are not required for the work are to be restored to their original state where feasible.

Locations where private land outside of the right-of-way that may be impacted are west of Angeline Street, the William/Colborne intersection, the Colborne/Angeline intersection improvements where significant property will be impacted on all four quadrants depending on the alignment of the Angeline Street 4-lane widening.

Mitigation measures for these two impacted areas will be part of the commitment to future work.

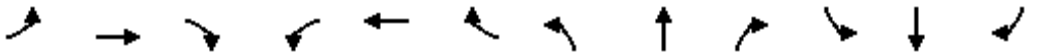
9.2.2 Commitments to Future Work

The following items will be addressed during detail design:

- verify of utility impacts from sidewalk widening;
- undertake Archaeological Assessment (if required);
- undertake Angeline Street Class EA;
- develop and evaluate intersection improvement alternatives as part of Angeline Street Class EA; and
- upon selection of preferred intersection improvements, verify property acquisition and utility impacts.

C

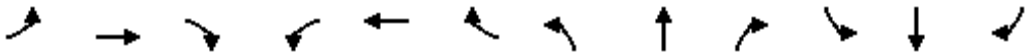
Appendix C: 2031 Conditions Synchro and SimTraffic Reports



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	381	89	6	274	94	120	222	9	39	133	58
Future Volume (vph)	67	381	89	6	274	94	120	222	9	39	133	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1770	1612		1763	1849		1756	1764	
Flt Permitted	0.50	1.00		0.43	1.00		0.52	1.00		0.43	1.00	
Satd. Flow (perm)	934	1810		792	1612		962	1849		789	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	414	97	7	298	102	130	241	10	42	145	63
RTOR Reduction (vph)	0	7	0	0	10	0	0	2	0	0	21	0
Lane Group Flow (vph)	73	504	0	7	390	0	130	249	0	42	187	0
Confl. Peds. (#/hr)							3		7	7		3
Parking (#/hr)					0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	59.1	59.1		59.1	59.1		18.9	18.9		18.9	18.9	
Effective Green, g (s)	59.1	59.1		59.1	59.1		18.9	18.9		18.9	18.9	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.21	0.21		0.21	0.21	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	613	1188		520	1058		202	388		165	370	
v/s Ratio Prot		c0.28			0.24			0.13			0.11	
v/s Ratio Perm	0.08			0.01			c0.14			0.05		
v/c Ratio	0.12	0.42		0.01	0.37		0.64	0.64		0.25	0.51	
Uniform Delay, d1	5.8	7.4		5.4	7.0		32.5	32.5		29.7	31.4	
Progression Factor	1.00	1.00		0.54	0.46		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1		0.0	1.0		7.6	4.0		1.1	1.5	
Delay (s)	6.2	8.5		2.9	4.2		40.1	36.5		30.8	32.9	
Level of Service	A	A		A	A		D	D		C	C	
Approach Delay (s)		8.2			4.2			37.7			32.6	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	261	116	29	195	190	152	190	39	75	88	28
Future Volume (vph)	52	261	116	29	195	190	152	190	39	75	88	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.6	5.6	5.6	5.8	5.8		5.8	5.8	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1763	1760		1759	1863	1544	1760	1807		1762	1784	
Flt Permitted	0.63	1.00		0.50	1.00	1.00	0.68	1.00		0.41	1.00	
Satd. Flow (perm)	1161	1760		917	1863	1544	1252	1807		763	1784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	284	126	32	212	207	165	207	42	82	96	30
RTOR Reduction (vph)	0	12	0	0	0	68	0	10	0	0	15	0
Lane Group Flow (vph)	57	398	0	32	212	139	165	239	0	82	111	0
Confl. Peds. (#/hr)	2		5	5		2	3		3	3		3
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	60.6	60.6		60.6	60.6	60.6	18.0	18.0		18.0	18.0	
Effective Green, g (s)	60.6	60.6		60.6	60.6	60.6	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.67	0.67		0.67	0.67	0.67	0.20	0.20		0.20	0.20	
Clearance Time (s)	5.6	5.6		5.6	5.6	5.6	5.8	5.8		5.8	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	781	1185		617	1254	1039	250	361		152	356	
v/s Ratio Prot		c0.23			0.11			c0.13			0.06	
v/s Ratio Perm	0.05			0.03		0.09	0.13			0.11		
v/c Ratio	0.07	0.34		0.05	0.17	0.13	0.66	0.66		0.54	0.31	
Uniform Delay, d1	5.1	6.2		5.0	5.4	5.3	33.2	33.2		32.3	30.7	
Progression Factor	0.68	0.58		0.84	0.82	0.44	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.2	0.3	0.3	6.4	4.5		3.7	0.5	
Delay (s)	3.6	4.3		4.4	4.7	2.6	39.6	37.7		35.9	31.2	
Level of Service	A	A		A	A	A	D	D		D	C	
Approach Delay (s)		4.2			3.7			38.4			33.1	
Approach LOS		A			A			D			C	

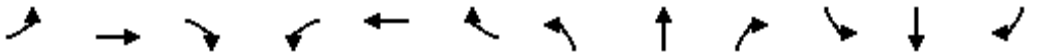
Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	215	159	133	350	63	237
Future Volume (vph)	215	159	133	350	63	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.61	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1142	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	173	145	380	68	258
RTOR Reduction (vph)	0	47	0	0	0	227
Lane Group Flow (vph)	234	126	145	380	68	31
Turn Type	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases		2	6		4	4
Actuated Green, G (s)	65.7	65.7	65.7	65.7	10.9	10.9
Effective Green, g (s)	65.7	65.7	65.7	65.7	10.9	10.9
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.12	0.12
Clearance Time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1359	1155	833	1359	214	191
v/s Ratio Prot	0.13			c0.20		
v/s Ratio Perm		0.08	0.13		c0.04	0.02
v/c Ratio	0.17	0.11	0.17	0.28	0.32	0.16
Uniform Delay, d1	3.8	3.6	3.8	4.1	36.2	35.5
Progression Factor	0.59	0.12	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.5	0.5	0.9	0.4
Delay (s)	2.5	0.6	4.2	4.6	37.0	35.9
Level of Service	A	A	A	A	D	D
Approach Delay (s)	1.7			4.5	36.1	
Approach LOS	A			A	D	

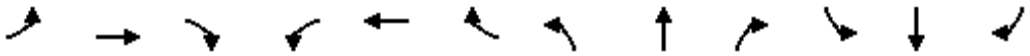
Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	408	96	7	295	101	129	238	10	41	143	62
Future Volume (vph)	72	408	96	7	295	101	129	238	10	41	143	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1764	1802		1767	1601		1765	1849		1762	1763	
Flt Permitted	0.48	1.00		0.40	1.00		0.50	1.00		0.41	1.00	
Satd. Flow (perm)	883	1802		737	1601		932	1849		753	1763	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	443	104	8	321	110	140	259	11	45	155	67
RTOR Reduction (vph)	0	7	0	0	11	0	0	2	0	0	20	0
Lane Group Flow (vph)	78	540	0	8	420	0	140	268	0	45	202	0
Confl. Peds. (#/hr)	4		2	2		4	2		4	4		2
Confl. Bikes (#/hr)			1			2			3			3
Parking (#/hr)					0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	57.9	57.9		57.9	57.9		20.1	20.1		20.1	20.1	
Effective Green, g (s)	57.9	57.9		57.9	57.9		20.1	20.1		20.1	20.1	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.22	0.22		0.22	0.22	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	568	1159		474	1029		208	412		168	393	
v/s Ratio Prot		c0.30			0.26			0.14			0.11	
v/s Ratio Perm	0.09			0.01			c0.15			0.06		
v/c Ratio	0.14	0.47		0.02	0.41		0.67	0.65		0.27	0.51	
Uniform Delay, d1	6.3	8.2		5.8	7.8		31.9	31.8		28.9	30.7	
Progression Factor	1.00	1.00		1.01	0.81		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.3		0.1	1.2		9.0	3.9		1.2	1.5	
Delay (s)	6.8	9.5		5.9	7.5		41.0	35.7		30.0	32.2	
Level of Service	A	A		A	A		D	D		C	C	
Approach Delay (s)		9.2			7.4			37.5			31.8	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	280	124	31	209	203	163	203	41	81	94	30
Future Volume (vph)	55	280	124	31	209	203	163	203	41	81	94	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8		5.8	5.8	5.8	5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1765		1768	1863	1548	1766	1802		1767	1778	
Flt Permitted	0.62	1.00		0.47	1.00	1.00	0.67	1.00		0.38	1.00	
Satd. Flow (perm)	1147	1765		882	1863	1548	1237	1802		716	1778	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	304	135	34	227	221	177	221	45	88	102	33
RTOR Reduction (vph)	0	12	0	0	0	75	0	10	0	0	16	0
Lane Group Flow (vph)	60	427	0	34	227	146	177	256	0	88	119	0
Confl. Peds. (#/hr)	1		1	1		1	1		7	1		7
Confl. Bikes (#/hr)									4			1
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	59.6	59.6		59.6	59.6	59.6	19.0	19.0		19.0	19.0	
Effective Green, g (s)	59.6	59.6		59.6	59.6	59.6	19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66	0.66	0.21	0.21		0.21	0.21	
Clearance Time (s)	5.8	5.8		5.8	5.8	5.8	5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	759	1168		584	1233	1025	261	380		151	375	
v/s Ratio Prot		c0.24			0.12			0.14			0.07	
v/s Ratio Perm	0.05			0.04		0.09	c0.14			0.12		
v/c Ratio	0.08	0.37		0.06	0.18	0.14	0.68	0.67		0.58	0.32	
Uniform Delay, d1	5.4	6.8		5.3	5.8	5.7	32.7	32.6		31.9	30.0	
Progression Factor	0.43	0.33		0.83	0.81	0.44	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.8		0.2	0.3	0.3	6.8	4.6		5.6	0.5	
Delay (s)	2.5	3.0		4.6	5.1	2.8	39.5	37.3		37.6	30.5	
Level of Service	A	A		A	A	A	D	D		D	C	
Approach Delay (s)		3.0			4.0			38.2			33.3	
Approach LOS		A			A			D			C	

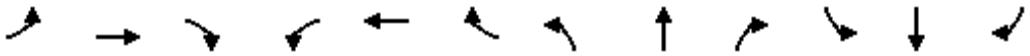
Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	231	171	143	376	68	255
Future Volume (vph)	231	171	143	376	68	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.60	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1124	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	186	155	409	74	277
RTOR Reduction (vph)	0	51	0	0	0	243
Lane Group Flow (vph)	251	135	155	409	74	34
Turn Type	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases		2	6		4	4
Actuated Green, G (s)	65.5	65.5	65.5	65.5	11.1	11.1
Effective Green, g (s)	65.5	65.5	65.5	65.5	11.1	11.1
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.12	0.12
Clearance Time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1355	1152	818	1355	218	195
v/s Ratio Prot	0.13			c0.22		
v/s Ratio Perm		0.09	0.14		c0.04	0.02
v/c Ratio	0.19	0.12	0.19	0.30	0.34	0.18
Uniform Delay, d1	3.9	3.6	3.9	4.3	36.1	35.3
Progression Factor	0.62	0.29	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.5	0.6	0.9	0.4
Delay (s)	2.7	1.3	4.4	4.8	37.0	35.8
Level of Service	A	A	A	A	D	D
Approach Delay (s)	2.1			4.7	36.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

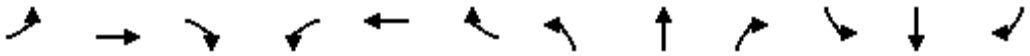
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	502	118	8	362	124	158	293	12	51	176	76
Future Volume (vph)	88	502	118	8	362	124	158	293	12	51	176	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1801		1767	1603		1768	1850		1769	1764	
Flt Permitted	0.26	1.00		0.29	1.00		0.40	1.00		0.35	1.00	
Satd. Flow (perm)	493	1801		542	1603		740	1850		643	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	546	128	9	393	135	172	318	13	55	191	83
RTOR Reduction (vph)	0	8	0	0	12	0	0	2	0	0	18	0
Lane Group Flow (vph)	96	666	0	9	516	0	172	329	0	55	256	0
Confl. Peds. (#/hr)	2		3	3		2	3		2	2		3
Parking (#/hr)					0	0						
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	47.6	47.6		39.6	39.6		27.4	22.4		25.4	21.4	
Effective Green, g (s)	47.6	47.6		39.6	39.6		27.4	22.4		25.4	21.4	
Actuated g/C Ratio	0.53	0.53		0.44	0.44		0.30	0.25		0.28	0.24	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	317	952		238	705		282	460		231	419	
v/s Ratio Prot	0.01	c0.37			0.32		c0.03	c0.18		0.01	0.14	
v/s Ratio Perm	0.15			0.02			0.15			0.06		
v/c Ratio	0.30	0.70		0.04	0.73		0.61	0.72		0.24	0.61	
Uniform Delay, d1	12.8	15.8		14.4	20.8		26.1	30.9		24.3	30.6	
Progression Factor	1.00	1.00		0.92	0.92		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	4.3		0.3	6.2		3.7	5.6		0.5	3.0	
Delay (s)	13.3	20.1		13.5	25.2		29.9	36.5		24.9	33.6	
Level of Service	B	C		B	C		C	D		C	C	
Approach Delay (s)		19.3			25.0			34.2			32.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	344	153	38	257	250	200	250	51	99	116	37
Future Volume (vph)	68	344	153	38	257	250	200	250	51	99	116	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		4.0	5.6	4.0	4.0	5.8		4.0	5.8	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1777		1770	1863	1583	1766	1808		1769	1785	
Flt Permitted	0.59	1.00		0.27	1.00	1.00	0.61	1.00		0.29	1.00	
Satd. Flow (perm)	1096	1777		497	1863	1583	1135	1808		545	1785	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	374	166	41	279	272	217	272	55	108	126	40
RTOR Reduction (vph)	0	16	0	0	0	108	0	9	0	0	13	0
Lane Group Flow (vph)	74	524	0	41	279	164	217	318	0	108	153	0
Confl. Peds. (#/hr)							2		2	2		2
Turn Type	Perm	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases		2		1	6	3	7	4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	41.4	41.4		48.4	48.4	54.4	26.2	20.2		26.2	20.2	
Effective Green, g (s)	41.4	41.4		48.4	48.4	54.4	26.2	20.2		26.2	20.2	
Actuated g/C Ratio	0.46	0.46		0.54	0.54	0.60	0.29	0.22		0.29	0.22	
Clearance Time (s)	5.6	5.6		4.0	5.6	4.0	4.0	5.8		4.0	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	504	817		309	1001	956	372	405		240	400	
v/s Ratio Prot		c0.30		0.00	c0.15	0.01	c0.04	c0.18		0.03	0.09	
v/s Ratio Perm	0.07			0.07		0.09	0.13			0.10		
v/c Ratio	0.15	0.64		0.13	0.28	0.17	0.58	0.79		0.45	0.38	
Uniform Delay, d1	14.1	18.6		12.0	11.3	7.9	26.3	32.9		24.7	29.6	
Progression Factor	0.34	0.37		0.84	0.81	0.37	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9		0.2	0.7	0.1	2.3	9.7		1.3	0.6	
Delay (s)	5.2	9.8		10.3	9.8	3.0	28.7	42.6		26.0	30.2	
Level of Service	A	A		B	A	A	C	D		C	C	
Approach Delay (s)		9.3			6.7			37.0			28.6	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.4
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	284	210	176	462	83	313
Future Volume (vph)	284	210	176	462	83	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	4.0	6.5	6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.52	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	973	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	309	228	191	502	90	340
RTOR Reduction (vph)	0	92	0	0	0	296
Lane Group Flow (vph)	309	136	191	502	90	44
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		4	4
Actuated Green, G (s)	53.6	53.6	64.9	64.9	11.7	11.7
Effective Green, g (s)	53.6	53.6	64.9	64.9	11.7	11.7
Actuated g/C Ratio	0.60	0.60	0.72	0.72	0.13	0.13
Clearance Time (s)	6.5	6.5	4.0	6.5	6.9	6.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1109	942	766	1343	230	205
v/s Ratio Prot	0.17		0.02	c0.27		
v/s Ratio Perm		0.09	0.16		c0.05	0.03
v/c Ratio	0.28	0.14	0.25	0.37	0.39	0.22
Uniform Delay, d1	8.8	8.1	4.1	4.8	35.9	35.0
Progression Factor	0.85	1.24	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.3	0.2	0.8	1.1	0.5
Delay (s)	8.0	10.3	4.3	5.6	37.0	35.6
Level of Service	A	B	A	A	D	D
Approach Delay (s)	9.0			5.2	35.9	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.4
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	20.4	68.0	5.5	50.9	32.0	42.0	11.5	41.5
Average Queue (m)	11.9	39.9	1.8	25.6	20.3	28.1	7.3	27.4
95th Queue (m)	28.1	75.2	7.7	51.0	37.0	50.8	15.5	45.8
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	1	17		12				
Queuing Penalty (veh)	4	11		1				

Intersection: 2: William Street & Colborne Street

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	10.5	31.7	13.0	22.8	26.7	39.4	51.0	22.7	27.7
Average Queue (m)	6.2	18.4	4.9	12.7	13.1	27.6	34.2	13.7	16.5
95th Queue (m)	13.6	37.4	15.4	25.4	30.7	44.7	53.6	27.5	28.8
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Lindsay Street & Colborne Street

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (m)	19.6	11.9	17.9	31.0	20.2	25.2
Average Queue (m)	7.4	5.3	11.8	13.7	13.2	17.0
95th Queue (m)	20.8	14.2	19.9	34.7	23.2	26.9
Link Distance (m)	251.6			105.4		195.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		60.0	80.0		80.0	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 16

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	25.1	70.0	3.6	58.6	40.4	61.5	19.2	43.2
Average Queue (m)	16.1	44.8	0.7	32.2	25.0	38.2	10.2	28.8
95th Queue (m)	29.9	75.4	4.8	60.9	41.8	65.9	21.0	45.6
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	3	21		15				
Queuing Penalty (veh)	14	15		1				

Intersection: 2: William Street & Colborne Street

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	15.6	31.6	14.0	25.6	31.5	39.6	53.8	26.2	31.4
Average Queue (m)	7.5	15.5	6.5	16.0	14.7	26.6	37.6	14.0	16.3
95th Queue (m)	18.4	33.4	16.3	29.3	32.5	43.5	57.7	34.0	32.5
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Lindsay Street & Colborne Street

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (m)	15.1	9.4	25.5	36.1	24.2	28.3
Average Queue (m)	6.5	2.9	16.2	21.3	15.4	17.8
95th Queue (m)	18.4	9.8	30.1	42.1	28.8	31.2
Link Distance (m)	251.6			105.4		195.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		60.0	80.0		80.0	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 30

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	27.3	142.3	24.8	99.2	56.8	90.3	25.6	68.5
Average Queue (m)	15.4	73.7	3.0	44.5	25.9	48.4	10.4	39.2
95th Queue (m)	29.7	122.3	13.5	78.1	44.6	78.5	21.3	63.2
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	3	32	0	27				
Queuing Penalty (veh)	17	28	0	2				

Intersection: 2: William Street & Colborne Street

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	23.6	57.2	16.8	53.0	38.1	70.3	83.7	36.5	47.0
Average Queue (m)	9.4	21.3	6.9	21.3	15.8	30.9	48.8	15.7	23.1
95th Queue (m)	19.9	44.5	15.2	41.4	30.6	54.5	78.8	29.7	40.8
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)		0		1					
Queuing Penalty (veh)		0		2					

Intersection: 3: Lindsay Street & Colborne Street

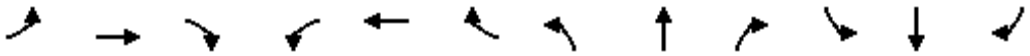
Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (m)	47.1	25.0	35.2	71.2	34.3	46.8
Average Queue (m)	18.6	10.5	16.3	28.8	15.1	22.5
95th Queue (m)	38.1	20.7	28.6	56.3	29.1	37.6
Link Distance (m)	251.6			105.4		195.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		60.0	80.0		80.0	
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Network Summary

Network wide Queuing Penalty: 49

D

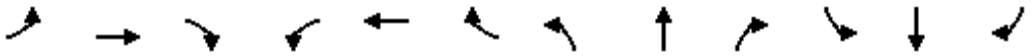
Appendix D: 2051 Conditions Synchro and SimTraffic Reports



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	566	133	9	411	139	176	330	14	58	199	86
Future Volume (vph)	99	566	133	9	411	139	176	330	14	58	199	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1613		1764	1849		1759	1765	
Flt Permitted	0.32	1.00		0.21	1.00		0.42	1.00		0.33	1.00	
Satd. Flow (perm)	605	1809		396	1613		781	1849		604	1765	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	615	145	10	447	151	191	359	15	63	216	93
RTOR Reduction (vph)	0	8	0	0	11	0	0	2	0	0	20	0
Lane Group Flow (vph)	108	752	0	10	587	0	191	372	0	63	289	0
Confl. Peds. (#/hr)							3		7	7		3
Parking (#/hr)					0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	51.2	51.2		51.2	51.2		26.8	26.8		26.8	26.8	
Effective Green, g (s)	51.2	51.2		51.2	51.2		26.8	26.8		26.8	26.8	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	344	1029		225	917		232	550		179	525	
v/s Ratio Prot		c0.42			0.36			0.20			0.16	
v/s Ratio Perm	0.18			0.03			c0.24			0.10		
v/c Ratio	0.31	0.73		0.04	0.64		0.82	0.68		0.35	0.55	
Uniform Delay, d1	10.2	14.3		8.6	13.2		29.4	27.8		24.8	26.5	
Progression Factor	1.00	1.00		0.88	0.83		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	4.6		0.3	3.2		21.3	3.6		1.6	1.5	
Delay (s)	12.6	18.9		7.9	14.2		50.7	31.4		26.4	28.0	
Level of Service	B	B		A	B		D	C		C	C	
Approach Delay (s)		18.1			14.1			37.9			27.7	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	388	172	42	290	281	227	281	57	111	130	42
Future Volume (vph)	77	388	172	42	290	281	227	281	57	111	130	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.6	5.6	5.6	5.8	5.8		5.8	5.8	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	1760		1764	1863	1544	1761	1807		1764	1782	
Flt Permitted	0.54	1.00		0.32	1.00	1.00	0.60	1.00		0.32	1.00	
Satd. Flow (perm)	1012	1760		602	1863	1544	1109	1807		590	1782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	422	187	46	315	305	247	305	62	121	141	46
RTOR Reduction (vph)	0	14	0	0	0	126	0	10	0	0	16	0
Lane Group Flow (vph)	84	595	0	46	315	179	247	357	0	121	171	0
Confl. Peds. (#/hr)	2		5	5		2	3		3	3		3
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	52.9	52.9		52.9	52.9	52.9	25.7	25.7		25.7	25.7	
Effective Green, g (s)	52.9	52.9		52.9	52.9	52.9	25.7	25.7		25.7	25.7	
Actuated g/C Ratio	0.59	0.59		0.59	0.59	0.59	0.29	0.29		0.29	0.29	
Clearance Time (s)	5.6	5.6		5.6	5.6	5.6	5.8	5.8		5.8	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	594	1034		353	1095	907	316	515		168	508	
v/s Ratio Prot		c0.34			0.17			0.20			0.10	
v/s Ratio Perm	0.08			0.08		0.12	c0.22			0.21		
v/c Ratio	0.14	0.58		0.13	0.29	0.20	0.78	0.69		0.72	0.34	
Uniform Delay, d1	8.3	11.6		8.3	9.2	8.7	29.6	28.6		28.9	25.4	
Progression Factor	0.30	0.23		0.81	0.79	0.31	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.7		0.7	0.6	0.5	11.9	4.0		14.1	0.4	
Delay (s)	2.8	4.3		7.4	7.9	3.2	41.4	32.7		43.0	25.8	
Level of Service	A	A		A	A	A	D	C		D	C	
Approach Delay (s)		4.1			5.7			36.2			32.6	
Approach LOS		A			A			D			C	

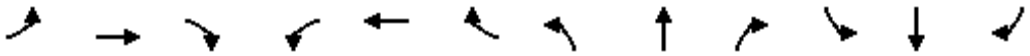
Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	320	237	199	520	94	353
Future Volume (vph)	320	237	199	520	94	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.55	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1029	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	258	216	565	102	384
RTOR Reduction (vph)	0	73	0	0	0	332
Lane Group Flow (vph)	348	185	216	565	102	52
Turn Type	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases		2	6		4	4
Actuated Green, G (s)	64.4	64.4	64.4	64.4	12.2	12.2
Effective Green, g (s)	64.4	64.4	64.4	64.4	12.2	12.2
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.14	0.14
Clearance Time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1333	1132	736	1333	239	214
v/s Ratio Prot	0.19			c0.30		
v/s Ratio Perm		0.12	0.21		c0.06	0.03
v/c Ratio	0.26	0.16	0.29	0.42	0.43	0.24
Uniform Delay, d1	4.5	4.1	4.6	5.2	35.7	34.8
Progression Factor	0.79	0.93	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.3	1.0	1.0	1.2	0.6
Delay (s)	3.9	4.1	5.6	6.2	36.9	35.4
Level of Service	A	A	A	A	D	D
Approach Delay (s)	4.0			6.1	35.7	
Approach LOS	A			A	D	

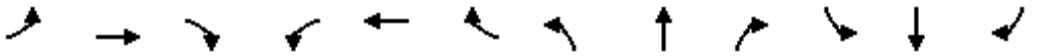
Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	608	142	10	441	150	189	354	15	62	213	92
Future Volume (vph)	106	608	142	10	441	150	189	354	15	62	213	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1802		1769	1601		1769	1849		1763	1763	
Flt Permitted	0.27	1.00		0.14	1.00		0.26	1.00		0.47	1.00	
Satd. Flow (perm)	499	1802		266	1601		479	1849		876	1763	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	661	154	11	479	163	205	385	16	67	232	100
RTOR Reduction (vph)	0	8	0	0	13	0	0	2	0	0	18	0
Lane Group Flow (vph)	115	807	0	11	629	0	205	399	0	67	314	0
Confl. Peds. (#/hr)	4		2	2		4	2		4	4		2
Confl. Bikes (#/hr)			1			2			3			3
Parking (#/hr)					0	0						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	47.9	47.9		47.9	47.9		30.1	30.1		21.1	21.1	
Effective Green, g (s)	47.9	47.9		47.9	47.9		30.1	30.1		21.1	21.1	
Actuated g/C Ratio	0.53	0.53		0.53	0.53		0.33	0.33		0.23	0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	265	959		141	852		231	618		205	413	
v/s Ratio Prot		c0.45			0.39		c0.05	0.22			0.18	
v/s Ratio Perm	0.23			0.04			c0.25			0.08		
v/c Ratio	0.43	0.84		0.08	0.74		0.89	0.65		0.33	0.76	
Uniform Delay, d1	12.8	17.8		10.3	16.2		28.2	25.4		28.6	32.1	
Progression Factor	1.00	1.00		0.93	0.84		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.1	8.8		1.0	5.3		30.9	2.6		1.3	8.3	
Delay (s)	17.9	26.7		10.6	18.9		59.1	28.0		29.8	40.4	
Level of Service	B	C		B	B		E	C		C	D	
Approach Delay (s)		25.6			18.8			38.5			38.6	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	417	185	46	312	302	244	302	61	120	140	45
Future Volume (vph)	83	417	185	46	312	302	244	302	61	120	140	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8		5.8	5.8	5.8	5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1765		1769	1863	1548	1767	1804		1768	1779	
Flt Permitted	0.52	1.00		0.28	1.00	1.00	0.58	1.00		0.30	1.00	
Satd. Flow (perm)	969	1765		522	1863	1548	1081	1804		566	1779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	453	201	50	339	328	265	328	66	130	152	49
RTOR Reduction (vph)	0	14	0	0	0	143	0	10	0	0	16	0
Lane Group Flow (vph)	90	640	0	50	339	185	265	384	0	130	185	0
Confl. Peds. (#/hr)	1		1	1		1	1		7	1		7
Confl. Bikes (#/hr)									4			1
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	50.8	50.8		50.8	50.8	50.8	27.8	27.8		27.8	27.8	
Effective Green, g (s)	50.8	50.8		50.8	50.8	50.8	27.8	27.8		27.8	27.8	
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56	0.31	0.31		0.31	0.31	
Clearance Time (s)	5.8	5.8		5.8	5.8	5.8	5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	546	996		294	1051	873	333	557		174	549	
v/s Ratio Prot		c0.36			0.18			0.21			0.10	
v/s Ratio Perm	0.09			0.10		0.12	c0.25			0.23		
v/c Ratio	0.16	0.64		0.17	0.32	0.21	0.80	0.69		0.75	0.34	
Uniform Delay, d1	9.4	13.4		9.4	10.4	9.7	28.5	27.3		27.9	24.0	
Progression Factor	0.25	0.22		0.80	0.78	0.35	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.9		1.1	0.7	0.5	12.4	3.6		16.0	0.4	
Delay (s)	2.7	4.8		8.7	8.9	3.9	40.9	30.9		43.9	24.4	
Level of Service	A	A		A	A	A	D	C		D	C	
Approach Delay (s)		4.6			6.6			34.9			32.0	
Approach LOS		A			A			C			C	

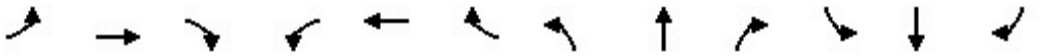
Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	343	254	213	558	101	378
Future Volume (vph)	343	254	213	558	101	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.54	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1002	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	373	276	232	607	110	411
RTOR Reduction (vph)	0	79	0	0	0	354
Lane Group Flow (vph)	373	197	232	607	110	57
Turn Type	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases		2	6		4	4
Actuated Green, G (s)	64.2	64.2	64.2	64.2	12.4	12.4
Effective Green, g (s)	64.2	64.2	64.2	64.2	12.4	12.4
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.14	0.14
Clearance Time (s)	6.5	6.5	6.5	6.5	6.9	6.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1328	1129	714	1328	243	218
v/s Ratio Prot	0.20			c0.33		
v/s Ratio Perm		0.12	0.23		c0.06	0.04
v/c Ratio	0.28	0.17	0.32	0.46	0.45	0.26
Uniform Delay, d1	4.6	4.2	4.8	5.5	35.7	34.7
Progression Factor	0.93	1.54	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.3	1.2	1.1	1.3	0.6
Delay (s)	4.7	6.8	6.0	6.6	37.0	35.3
Level of Service	A	A	A	A	D	D
Approach Delay (s)	5.6			6.5	35.7	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

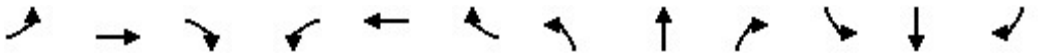
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	747	175	12	542	184	232	435	18	76	262	113
Future Volume (vph)	130	747	175	12	542	184	232	435	18	76	262	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1801		1770	1603		1770	1850		1769	1764	
Flt Permitted	0.07	1.00		0.07	1.00		0.13	1.00		0.18	1.00	
Satd. Flow (perm)	128	1801		137	1603		242	1850		337	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	812	190	13	589	200	252	473	20	83	285	123
RTOR Reduction (vph)	0	7	0	0	10	0	0	1	0	0	13	0
Lane Group Flow (vph)	141	995	0	13	779	0	252	492	0	83	395	0
Confl. Peds. (#/hr)	2		3	3		2	3		2	2		3
Parking (#/hr)					0	0						
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	64.2	64.2		54.2	54.2		43.8	35.8		30.8	26.8	
Effective Green, g (s)	64.2	64.2		54.2	54.2		43.8	35.8		30.8	26.8	
Actuated g/C Ratio	0.54	0.54		0.45	0.45		0.36	0.30		0.26	0.22	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	150	963		61	724		253	551		134	393	
v/s Ratio Prot	0.05	c0.55			0.49		c0.11	0.27		0.02	0.22	
v/s Ratio Perm	0.45			0.09			c0.25			0.14		
v/c Ratio	0.94	1.03		0.21	1.08		1.00	0.89		0.62	1.00	
Uniform Delay, d1	29.0	27.9		20.0	32.9		32.4	40.3		37.3	46.6	
Progression Factor	1.00	1.00		0.82	0.75		1.00	1.00		1.00	1.00	
Incremental Delay, d2	55.0	37.9		6.2	52.2		55.1	16.9		8.3	46.5	
Delay (s)	84.0	65.8		22.7	77.0		87.5	57.2		45.6	93.1	
Level of Service	F	E		C	E		F	E		D	F	
Approach Delay (s)		68.0			76.1			67.5			85.1	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	72.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	127.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	512	227	56	383	371	300	371	75	147	172	55
Future Volume (vph)	102	512	227	56	383	371	300	371	75	147	172	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		4.0	5.6	4.0	4.0	5.8		4.0	5.8	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1777		1770	1863	1583	1768	1808		1770	1784	
Flt Permitted	0.49	1.00		0.07	1.00	1.00	0.35	1.00		0.15	1.00	
Satd. Flow (perm)	909	1777		125	1863	1583	653	1808		277	1784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	557	247	61	416	403	326	403	82	160	187	60
RTOR Reduction (vph)	0	13	0	0	0	64	0	6	0	0	9	0
Lane Group Flow (vph)	111	791	0	61	416	339	326	479	0	160	238	0
Confl. Peds. (#/hr)							2		2	2		2
Turn Type	Perm	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases		2		1	6	3	7	4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	55.7	55.7		63.7	63.7	71.7	44.9	32.9		34.9	26.9	
Effective Green, g (s)	55.7	55.7		63.7	63.7	71.7	44.9	32.9		34.9	26.9	
Actuated g/C Ratio	0.46	0.46		0.53	0.53	0.60	0.37	0.27		0.29	0.22	
Clearance Time (s)	5.6	5.6		4.0	5.6	4.0	4.0	5.8		4.0	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	421	824		121	988	945	374	495		180	399	
v/s Ratio Prot		c0.45		0.02	c0.22	0.02	c0.10	c0.27		0.06	0.13	
v/s Ratio Perm	0.12			0.25		0.19	0.22			0.20		
v/c Ratio	0.26	0.96		0.50	0.42	0.36	0.87	0.97		0.89	0.60	
Uniform Delay, d1	19.6	31.1		25.1	17.0	12.4	31.9	43.0		36.1	41.7	
Progression Factor	0.73	0.62		1.34	0.80	0.68	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	9.5		2.9	1.2	0.2	19.4	32.0		37.1	2.4	
Delay (s)	14.7	28.7		36.5	14.7	8.6	51.3	75.0		73.2	44.1	
Level of Service	B	C		D	B	A	D	E		E	D	
Approach Delay (s)		27.0			13.5			65.5			55.5	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	37.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.4
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	422	312	262	686	124	465
Future Volume (vph)	422	312	262	686	124	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5	4.0	6.5	6.9	6.9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.42	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	785	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	459	339	285	746	135	505
RTOR Reduction (vph)	0	115	0	0	0	411
Lane Group Flow (vph)	459	224	285	746	135	94
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		4	4
Actuated Green, G (s)	76.3	76.3	90.3	90.3	16.3	16.3
Effective Green, g (s)	76.3	76.3	90.3	90.3	16.3	16.3
Actuated g/C Ratio	0.64	0.64	0.75	0.75	0.14	0.14
Clearance Time (s)	6.5	6.5	4.0	6.5	6.9	6.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1184	1006	672	1401	240	215
v/s Ratio Prot	0.25		0.04	c0.40		
v/s Ratio Perm		0.14	0.28		c0.08	0.06
v/c Ratio	0.39	0.22	0.42	0.53	0.56	0.44
Uniform Delay, d1	10.6	9.3	5.3	6.1	48.5	47.6
Progression Factor	0.88	1.02	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.4	1.5	3.0	1.4
Delay (s)	9.6	9.7	5.7	7.6	51.5	49.0
Level of Service	A	A	A	A	D	D
Approach Delay (s)	9.7			7.1	49.6	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.4
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	27.2	164.6	5.4	90.0	45.9	59.2	20.3	51.8
Average Queue (m)	19.6	121.8	1.3	64.1	30.9	44.8	13.6	35.7
95th Queue (m)	32.2	200.6	10.1	101.5	51.4	64.4	25.8	57.7
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)		3						
Queuing Penalty (veh)		0						
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	15	44		34				
Queuing Penalty (veh)	108	43		3				

Intersection: 2: William Street & Colborne Street

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	26.0	54.5	20.2	44.9	33.4	55.4	58.2	36.5	25.9
Average Queue (m)	12.4	25.0	9.4	26.7	21.8	40.2	42.2	23.1	17.2
95th Queue (m)	34.5	57.5	23.4	49.7	37.9	59.3	62.0	45.7	29.9
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)		1		0					
Queuing Penalty (veh)		0		1					

Intersection: 3: Lindsay Street & Colborne Street

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (m)	28.2	15.4	28.3	51.7	34.5	45.0
Average Queue (m)	14.8	8.0	19.3	31.3	19.2	29.1
95th Queue (m)	31.8	17.8	34.6	58.5	38.7	50.5
Link Distance (m)	251.6			105.4		195.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		60.0	80.0		80.0	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 156

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	24.6	177.1	10.8	94.3	45.0	70.7	18.2	66.8
Average Queue (m)	19.4	126.4	3.8	60.3	31.4	46.7	12.1	43.6
95th Queue (m)	32.3	213.0	13.8	100.8	49.8	73.1	23.1	72.2
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)		5						
Queuing Penalty (veh)		0						
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	19	39		34				
Queuing Penalty (veh)	140	42		3				

Intersection: 2: William Street & Colborne Street

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	30.9	59.6	27.8	56.0	46.2	46.9	66.3	37.5	26.5
Average Queue (m)	14.7	36.8	14.2	27.5	24.4	35.0	46.9	26.0	14.4
95th Queue (m)	35.0	69.8	29.8	59.7	50.6	51.8	70.9	45.8	29.2
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)		1		2					
Queuing Penalty (veh)		1		6					

Intersection: 3: Lindsay Street & Colborne Street

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (m)	34.9	22.8	35.6	54.1	24.8	46.4
Average Queue (m)	21.1	11.2	21.5	37.6	17.1	31.4
95th Queue (m)	39.3	25.2	39.0	62.1	35.9	49.9
Link Distance (m)	251.6			105.4		195.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		60.0	80.0		80.0	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 192

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	27.3	231.5	23.8	250.0	113.6	155.3	199.4	216.6
Average Queue (m)	22.9	221.3	4.9	132.1	49.9	95.8	157.1	195.8
95th Queue (m)	32.4	226.6	16.1	222.4	89.7	151.3	298.2	253.7
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)		65		0		0	35	71
Queuing Penalty (veh)		0		1		0	0	0
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	35	42	0	45				
Queuing Penalty (veh)	324	54	3	5				

Intersection: 2: William Street & Colborne Street

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	65.4	89.2	50.3	98.4	72.7	127.4	188.7	77.7	76.9
Average Queue (m)	18.4	47.9	15.5	43.3	26.9	84.9	124.6	40.9	44.5
95th Queue (m)	40.8	76.3	38.7	75.3	54.8	148.4	201.9	77.4	69.0
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)							7		
Queuing Penalty (veh)							0		
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)	0	6	0	6	0	4	13	0	
Queuing Penalty (veh)	3	7	0	24	0	19	38	0	

Intersection: 3: Lindsay Street & Colborne Street

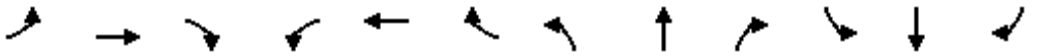
Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (m)	75.3	66.8	80.6	110.0	71.6	105.7
Average Queue (m)	32.6	17.7	35.0	55.3	30.7	48.6
95th Queue (m)	58.2	39.5	69.7	98.2	56.5	85.8
Link Distance (m)	251.6			105.4		195.0
Upstream Blk Time (%)				1		
Queuing Penalty (veh)				0		
Storage Bay Dist (m)		60.0	80.0		80.0	
Storage Blk Time (%)	1	0	0	3		1
Queuing Penalty (veh)	2	0	0	7		2

Network Summary

Network wide Queuing Penalty: 491

E

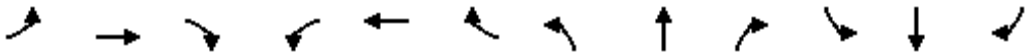
Appendix E: 2031 Conditions Synchro and SimTraffic Reports – Stop Control on Lindsay



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	381	89	6	274	94	120	222	9	39	133	58
Future Volume (vph)	67	381	89	6	274	94	120	222	9	39	133	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1770	1612		1763	1849		1756	1764	
Flt Permitted	0.50	1.00		0.43	1.00		0.52	1.00		0.43	1.00	
Satd. Flow (perm)	934	1810		792	1612		962	1849		789	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	414	97	7	298	102	130	241	10	42	145	63
RTOR Reduction (vph)	0	7	0	0	10	0	0	2	0	0	21	0
Lane Group Flow (vph)	73	504	0	7	390	0	130	249	0	42	187	0
Confl. Peds. (#/hr)							3		7	7		3
Parking (#/hr)					0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	59.1	59.1		59.1	59.1		18.9	18.9		18.9	18.9	
Effective Green, g (s)	59.1	59.1		59.1	59.1		18.9	18.9		18.9	18.9	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.21	0.21		0.21	0.21	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	613	1188		520	1058		202	388		165	370	
v/s Ratio Prot		c0.28			0.24			0.13			0.11	
v/s Ratio Perm	0.08			0.01			c0.14			0.05		
v/c Ratio	0.12	0.42		0.01	0.37		0.64	0.64		0.25	0.51	
Uniform Delay, d1	5.8	7.4		5.4	7.0		32.5	32.5		29.7	31.4	
Progression Factor	1.00	1.00		0.63	0.50		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1		0.0	1.0		7.6	4.0		1.1	1.5	
Delay (s)	6.2	8.5		3.4	4.5		40.1	36.5		30.8	32.9	
Level of Service	A	A		A	A		D	D		C	C	
Approach Delay (s)		8.2			4.5			37.7			32.6	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	261	116	29	195	190	152	190	39	75	88	28
Future Volume (vph)	52	261	116	29	195	190	152	190	39	75	88	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.6	5.6	5.6	5.8	5.8		5.8	5.8	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1763	1760		1759	1863	1544	1760	1807		1762	1784	
Flt Permitted	0.63	1.00		0.50	1.00	1.00	0.68	1.00		0.41	1.00	
Satd. Flow (perm)	1161	1760		917	1863	1544	1252	1807		763	1784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	284	126	32	212	207	165	207	42	82	96	30
RTOR Reduction (vph)	0	12	0	0	0	68	0	10	0	0	15	0
Lane Group Flow (vph)	57	398	0	32	212	139	165	239	0	82	111	0
Confl. Peds. (#/hr)	2		5	5		2	3		3	3		3
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	60.6	60.6		60.6	60.6	60.6	18.0	18.0		18.0	18.0	
Effective Green, g (s)	60.6	60.6		60.6	60.6	60.6	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.67	0.67		0.67	0.67	0.67	0.20	0.20		0.20	0.20	
Clearance Time (s)	5.6	5.6		5.6	5.6	5.6	5.8	5.8		5.8	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	781	1185		617	1254	1039	250	361		152	356	
v/s Ratio Prot		c0.23			0.11			c0.13			0.06	
v/s Ratio Perm	0.05			0.03		0.09	0.13			0.11		
v/c Ratio	0.07	0.34		0.05	0.17	0.13	0.66	0.66		0.54	0.31	
Uniform Delay, d1	5.1	6.2		5.0	5.4	5.3	33.2	33.2		32.3	30.7	
Progression Factor	0.68	0.58		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.2	0.3	0.3	6.4	4.5		3.7	0.5	
Delay (s)	3.6	4.3		5.1	5.7	5.5	39.6	37.7		35.9	31.2	
Level of Service	A	A		A	A	A	D	D		D	C	
Approach Delay (s)		4.2			5.6			38.4			33.1	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	215	159	133	350	63	237
Future Volume (Veh/h)	215	159	133	350	63	237
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	173	145	380	68	258
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	275					
pX, platoon unblocked						
vC, conflicting volume			407		904	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			407		904	234
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			87		75	68
cM capacity (veh/h)			1152		269	805

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	234	173	145	380	68	258
Volume Left	0	0	145	0	68	0
Volume Right	0	173	0	0	0	258
cSH	1700	1700	1152	1700	269	805
Volume to Capacity	0.14	0.10	0.13	0.22	0.25	0.32
Queue Length 95th (m)	0.0	0.0	3.4	0.0	7.8	11.1
Control Delay (s)	0.0	0.0	8.6	0.0	22.9	11.6
Lane LOS			A		C	B
Approach Delay (s)	0.0		2.4		13.9	
Approach LOS					B	

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	21.0	68.0	5.5	50.2	32.0	42.0	11.5	41.5
Average Queue (m)	11.6	39.9	1.8	24.9	20.3	28.1	7.3	27.4
95th Queue (m)	28.4	75.2	7.7	51.8	37.0	50.8	15.5	45.8
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	1	17		11				
Queuing Penalty (veh)	4	11		1				

Intersection: 2: William Street & Colborne Street

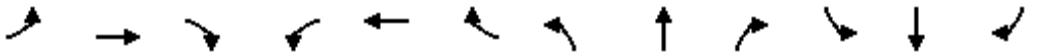
Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	10.5	31.7	11.6	24.3	32.6	39.4	51.0	22.7	27.7
Average Queue (m)	5.3	18.4	4.9	14.9	14.9	27.6	34.2	13.7	16.5
95th Queue (m)	13.3	37.4	13.5	27.0	35.8	44.7	53.6	27.5	28.8
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Lindsay Street & Colborne Street

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (m)	9.3	13.0	24.4
Average Queue (m)	8.4	8.9	14.9
95th Queue (m)	12.5	12.9	26.0
Link Distance (m)			195.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	80.0	80.0	
Storage Blk Time (%)			
Queuing Penalty (veh)			

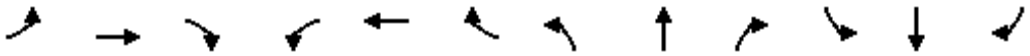
Network Summary

Network wide Queuing Penalty: 16



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	408	96	7	295	101	129	238	10	41	143	62
Future Volume (vph)	72	408	96	7	295	101	129	238	10	41	143	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1764	1802		1767	1601		1765	1849		1762	1763	
Flt Permitted	0.48	1.00		0.40	1.00		0.50	1.00		0.41	1.00	
Satd. Flow (perm)	883	1802		737	1601		932	1849		753	1763	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	443	104	8	321	110	140	259	11	45	155	67
RTOR Reduction (vph)	0	7	0	0	11	0	0	2	0	0	20	0
Lane Group Flow (vph)	78	540	0	8	420	0	140	268	0	45	202	0
Confl. Peds. (#/hr)	4		2	2		4	2		4	4		2
Confl. Bikes (#/hr)			1			2			3			3
Parking (#/hr)					0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	57.9	57.9		57.9	57.9		20.1	20.1		20.1	20.1	
Effective Green, g (s)	57.9	57.9		57.9	57.9		20.1	20.1		20.1	20.1	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.22	0.22		0.22	0.22	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	568	1159		474	1029		208	412		168	393	
v/s Ratio Prot		c0.30			0.26			0.14			0.11	
v/s Ratio Perm	0.09			0.01			c0.15			0.06		
v/c Ratio	0.14	0.47		0.02	0.41		0.67	0.65		0.27	0.51	
Uniform Delay, d1	6.3	8.2		5.8	7.8		31.9	31.8		28.9	30.7	
Progression Factor	1.00	1.00		1.22	0.93		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.3		0.1	1.2		9.0	3.9		1.2	1.5	
Delay (s)	6.8	9.5		7.1	8.4		41.0	35.7		30.0	32.2	
Level of Service	A	A		A	A		D	D		C	C	
Approach Delay (s)		9.2			8.4			37.5			31.8	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	280	124	31	209	203	163	203	41	81	94	30
Future Volume (vph)	55	280	124	31	209	203	163	203	41	81	94	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8		5.8	5.8	5.8	5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1765		1768	1863	1548	1766	1802		1767	1778	
Flt Permitted	0.62	1.00		0.47	1.00	1.00	0.67	1.00		0.38	1.00	
Satd. Flow (perm)	1147	1765		882	1863	1548	1237	1802		716	1778	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	304	135	34	227	221	177	221	45	88	102	33
RTOR Reduction (vph)	0	12	0	0	0	75	0	10	0	0	16	0
Lane Group Flow (vph)	60	427	0	34	227	146	177	256	0	88	119	0
Confl. Peds. (#/hr)	1		1	1		1	1		7	1		7
Confl. Bikes (#/hr)									4			1
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	59.6	59.6		59.6	59.6	59.6	19.0	19.0		19.0	19.0	
Effective Green, g (s)	59.6	59.6		59.6	59.6	59.6	19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66	0.66	0.21	0.21		0.21	0.21	
Clearance Time (s)	5.8	5.8		5.8	5.8	5.8	5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	759	1168		584	1233	1025	261	380		151	375	
v/s Ratio Prot		c0.24			0.12			0.14			0.07	
v/s Ratio Perm	0.05			0.04		0.09	c0.14			0.12		
v/c Ratio	0.08	0.37		0.06	0.18	0.14	0.68	0.67		0.58	0.32	
Uniform Delay, d1	5.4	6.8		5.3	5.8	5.7	32.7	32.6		31.9	30.0	
Progression Factor	0.43	0.33		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.8		0.2	0.3	0.3	6.8	4.6		5.6	0.5	
Delay (s)	2.5	3.0		5.5	6.2	6.0	39.5	37.3		37.6	30.5	
Level of Service	A	A		A	A	A	D	D		D	C	
Approach Delay (s)		3.0			6.0			38.2			33.3	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.4
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	231	171	143	376	68	255
Future Volume (Veh/h)	231	171	143	376	68	255
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	251	186	155	409	74	277
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	275					
pX, platoon unblocked						
vC, conflicting volume			437		970	251
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			437		970	251
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		69	65
cM capacity (veh/h)			1123		242	788

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	251	186	155	409	74	277
Volume Left	0	0	155	0	74	0
Volume Right	0	186	0	0	0	277
cSH	1700	1700	1123	1700	242	788
Volume to Capacity	0.15	0.11	0.14	0.24	0.31	0.35
Queue Length 95th (m)	0.0	0.0	3.8	0.0	10.0	12.7
Control Delay (s)	0.0	0.0	8.7	0.0	26.3	12.0
Lane LOS			A		D	B
Approach Delay (s)	0.0		2.4		15.0	
Approach LOS					C	

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	25.1	70.0	3.6	60.6	40.4	61.5	19.2	43.2
Average Queue (m)	16.4	44.8	0.7	36.2	25.0	38.2	10.2	28.8
95th Queue (m)	30.0	75.4	4.8	64.4	41.8	65.9	21.0	45.6
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	3	21		18				
Queuing Penalty (veh)	14	15		1				

Intersection: 2: William Street & Colborne Street

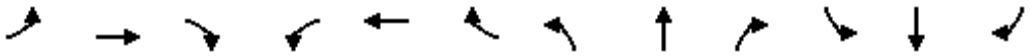
Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	14.2	31.6	12.8	30.2	31.5	39.6	53.8	26.2	31.4
Average Queue (m)	7.4	15.8	6.5	20.0	17.2	26.6	37.6	14.0	16.3
95th Queue (m)	17.5	33.5	15.8	34.6	33.7	43.5	57.7	34.0	32.5
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Lindsay Street & Colborne Street

Movement	EB	WB	NB	NB
Directions Served	T	L	L	R
Maximum Queue (m)	1.3	14.8	16.6	25.7
Average Queue (m)	0.3	9.0	11.6	15.3
95th Queue (m)	2.4	18.7	20.6	27.6
Link Distance (m)	251.6			195.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)		80.0	80.0	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

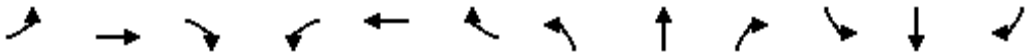
Network wide Queuing Penalty: 30



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	502	118	8	362	124	158	293	12	51	176	76
Future Volume (vph)	88	502	118	8	362	124	158	293	12	51	176	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1801		1767	1603		1768	1850		1769	1764	
Flt Permitted	0.26	1.00		0.29	1.00		0.40	1.00		0.35	1.00	
Satd. Flow (perm)	493	1801		542	1603		740	1850		643	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	546	128	9	393	135	172	318	13	55	191	83
RTOR Reduction (vph)	0	8	0	0	12	0	0	2	0	0	18	0
Lane Group Flow (vph)	96	666	0	9	516	0	172	329	0	55	256	0
Confl. Peds. (#/hr)	2		3	3		2	3		2	2		3
Parking (#/hr)					0	0						
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	47.6	47.6		39.6	39.6		27.4	22.4		25.4	21.4	
Effective Green, g (s)	47.6	47.6		39.6	39.6		27.4	22.4		25.4	21.4	
Actuated g/C Ratio	0.53	0.53		0.44	0.44		0.30	0.25		0.28	0.24	
Clearance Time (s)	4.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	317	952		238	705		282	460		231	419	
v/s Ratio Prot	0.01	c0.37			0.32		c0.03	c0.18		0.01	0.14	
v/s Ratio Perm	0.15			0.02			0.15			0.06		
v/c Ratio	0.30	0.70		0.04	0.73		0.61	0.72		0.24	0.61	
Uniform Delay, d1	12.8	15.8		14.4	20.8		26.1	30.9		24.3	30.6	
Progression Factor	1.00	1.00		1.04	0.99		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	4.3		0.3	6.2		3.7	5.6		0.5	3.0	
Delay (s)	13.3	20.1		15.2	26.8		29.9	36.5		24.9	33.6	
Level of Service	B	C		B	C		C	D		C	C	
Approach Delay (s)		19.3			26.6			34.2			32.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	344	153	38	257	250	200	250	51	99	116	37
Future Volume (vph)	68	344	153	38	257	250	200	250	51	99	116	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		4.0	5.6	4.0	4.0	5.8		4.0	5.8	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1777		1770	1863	1583	1766	1808		1769	1785	
Flt Permitted	0.59	1.00		0.27	1.00	1.00	0.61	1.00		0.29	1.00	
Satd. Flow (perm)	1096	1777		497	1863	1583	1135	1808		545	1785	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	374	166	41	279	272	217	272	55	108	126	40
RTOR Reduction (vph)	0	16	0	0	0	108	0	9	0	0	13	0
Lane Group Flow (vph)	74	524	0	41	279	164	217	318	0	108	153	0
Confl. Peds. (#/hr)							2		2	2		2
Turn Type	Perm	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases		2		1	6	3	7	4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	41.4	41.4		48.4	48.4	54.4	26.2	20.2		26.2	20.2	
Effective Green, g (s)	41.4	41.4		48.4	48.4	54.4	26.2	20.2		26.2	20.2	
Actuated g/C Ratio	0.46	0.46		0.54	0.54	0.60	0.29	0.22		0.29	0.22	
Clearance Time (s)	5.6	5.6		4.0	5.6	4.0	4.0	5.8		4.0	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	504	817		309	1001	956	372	405		240	400	
v/s Ratio Prot		c0.30		0.00	c0.15	0.01	c0.04	c0.18		0.03	0.09	
v/s Ratio Perm	0.07			0.07		0.09	0.13			0.10		
v/c Ratio	0.15	0.64		0.13	0.28	0.17	0.58	0.79		0.45	0.38	
Uniform Delay, d1	14.1	18.6		12.0	11.3	7.9	26.3	32.9		24.7	29.6	
Progression Factor	0.34	0.37		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9		0.2	0.7	0.1	2.3	9.7		1.3	0.6	
Delay (s)	5.2	9.8		12.2	12.0	7.9	28.7	42.6		26.0	30.2	
Level of Service	A	A		B	B	A	C	D		C	C	
Approach Delay (s)		9.3			10.2			37.0			28.6	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.4
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	284	210	176	462	83	313
Future Volume (Veh/h)	284	210	176	462	83	313
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	309	228	191	502	90	340
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	275					
pX, platoon unblocked						
vC, conflicting volume			537		1193	309
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			537		1193	309
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		47	53
cM capacity (veh/h)			1031		168	731

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	309	228	191	502	90	340
Volume Left	0	0	191	0	90	0
Volume Right	0	228	0	0	0	340
cSH	1700	1700	1031	1700	168	731
Volume to Capacity	0.18	0.13	0.19	0.30	0.53	0.47
Queue Length 95th (m)	0.0	0.0	5.4	0.0	21.6	19.9
Control Delay (s)	0.0	0.0	9.3	0.0	48.7	14.1
Lane LOS			A		E	B
Approach Delay (s)	0.0		2.6		21.4	
Approach LOS					C	

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Victoria Avenue & Colborne Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	27.3	142.3	24.9	91.0	51.8	88.3	25.6	68.5
Average Queue (m)	15.4	73.1	2.8	48.4	25.3	48.3	10.5	39.4
95th Queue (m)	29.6	121.4	12.9	79.7	43.1	77.8	21.5	63.4
Link Distance (m)		215.1		301.0	183.1	183.1	206.4	206.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	20.0		20.0					
Storage Blk Time (%)	4	32	0	29				
Queuing Penalty (veh)	23	28	0	2				

Intersection: 2: William Street & Colborne Street

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	25.9	59.6	18.9	52.0	38.3	73.9	88.1	36.5	47.0
Average Queue (m)	9.3	21.2	7.4	22.0	15.6	31.2	49.1	15.7	22.9
95th Queue (m)	19.5	44.7	16.4	42.4	29.9	55.6	79.0	29.9	39.8
Link Distance (m)		301.0		251.6			184.8		120.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	60.0		50.0		70.0	120.0		100.0	
Storage Blk Time (%)		0		0					
Queuing Penalty (veh)		0		1					

Intersection: 3: Lindsay Street & Colborne Street

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	L	L	R
Maximum Queue (m)	3.9	10.7	27.2	33.0	43.3
Average Queue (m)	0.2	1.2	11.9	12.6	17.4
95th Queue (m)	1.9	6.0	22.7	24.9	30.3
Link Distance (m)	251.6				195.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		60.0	80.0	80.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 54

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Geotechnical and Hydrogeological Site Investigation Report Colborne Street Bridge

City of Kawartha Lakes, Ontario

GEMTEC Project: 101240.007

GEMTEC
www.gemtec.ca

Submitted to:

CIMA+
4096 Meadowbrook Drive, Unit 112
London, Ontario
N6L 1G4

Geotechnical and Hydrogeological Site Investigation Report Colborne Street Bridge City of Kawartha Lakes, Ontario

December 5, 2025
GEMTEC Project: 101240.007

experience • knowledge • integrity

GEMTEC Consulting Engineers and Scientists Limited
6695 Millcreek Drive, Unit 7,
Mississauga, ON, Canada
L5N 5M4

December 5, 2025 File: 101240.007 – Rev0

CIMA+
4096 Meadowbrook Drive, Unit 112
London, Ontario
N6L 1G4

Attention: Akram Khan, M.A.Sc., P.Eng.

Re: Geotechnical and Hydrogeological Site Investigation Report
Colborne Street Bridge, City of Kawartha Lakes, Ontario

Enclosed is our Geotechnical and Hydrogeological Site Investigation Report to support detail design of the proposed Colborne Street bridge over Scugog River in Lindsay, Ontario, part of the City of Kawartha Lakes. The report presented herein is based on the scope of work summarized in our proposal dated October 27, 2022. This report was prepared by Mr. Matthew Kelly, P.Eng. and Mr. Andy Weatherson, M.Env.Sc., P.Geo, and reviewed by Dr. Graeme Skinner, Ph.D, P.Eng. and Mr. Chris Kozuskanich, P.Geo. (hydrogeological aspects).

Matthew Kelly, P.Eng.
Senior Geotechnical Engineer

Graeme Skinner, Ph.D., P.Eng.
Reviewer, Senior Geotechnical Engineer

Andy Weatherson, M.Env.Sc., P.Geo.
Hydrogeologist

Chris Kozuskanich, P.Geo.
Reviewer, Senior Hydrogeologist

MWK/AW/GDS/CK/sv/tc

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1.0 INTRODUCTION

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) has been retained by CIMA+ Inc. (CIMA) to carry out a geotechnical and hydrogeological site investigation to support the design of the proposed Colborne Street bridge over Scugog River in Lindsay, Ontario, part of the City of Kawartha Lakes, herein referred to as the "Site".

The purpose of the geotechnical and hydrogeological investigation is to identify the subsurface soil, bedrock and groundwater conditions at the foundation elements of the proposed bridge by means of a limited number of boreholes, and based on the factual data obtained, to provide geotechnical engineering and hydrogeological recommendations on the design aspects of the bridge structure, including construction considerations that could influence design decisions.

Environmental services are also being provided by GEMTEC for this project and will be provided under separate cover.

This report is subject to the Conditions and Limitations of This Report, which are included in Appendix A, and are considered an integral part of the report. The factual data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, or if the project is not initiated within eighteen months of the date of the report, GEMTEC should be given an opportunity to confirm that the recommendations in this report are still valid.

2.0 SITE DESCRIPTION

Existing Colborne Street East and Colborne Street West are separated by the Scugog River and there is currently no road that crosses the river in this vicinity. The proposed bridge structure will connect the east and west streets generally along the alignment of the existing streets extended over the river. Colborne Street in this vicinity is a two-lane roadway that is generally flat near the riverbanks and slopes upward to the east and west away from the river.

The Scugog River flows southward from Sturgeon Lake to Lake Scugog, gently meandering through Lindsay and is about 40 m wide at the crossing location. The base of the river is at about Elevation 245 m and the two-year average seasonal high-water level is at about Elevation 249 m, according to the information presented on the preliminary General Arrangement drawing by CIMA, dated May 25, 2023. The flood plain in the area of the proposed crossing is currently occupied by parking areas, parks/green spaces, and recreational trails, with a pumping station located on the eastern side of the river.

Based on the General Arrangement drawing, the proposed bridge structure will be a two-lane two-span structure (span lengths of about 37 m and 59 m) with the centre pier located on the west

bank of the river. The grade of the roadway slopes downward from about Elevation 257 m at the west abutment to about Elevation 254 m at the east abutment.

3.0 INVESTIGATION PROCEDURES

3.1 Geotechnical Investigation

A geotechnical investigation was carried out at the site between June 8 and June 9, 2023, during which time six boreholes, designated as Boreholes BH23-F1 to BH23-F4 and BH23-P1 to BH23-P2, were advanced at each of the south and north abutments, the centre pier and the proposed storm water management pond. Details of the SWMP were not available at the time this report was submitted and will be addressed in an updated report or Memorandum at a later date. The locations of the boreholes are shown on Figure 1 in Appendix B and the Record of Borehole Sheets are provided in Appendix C. Lists of abbreviations and symbols are also provided in Appendix C to assist in the interpretation of the Record of Borehole Sheets.

The field work was carried out using a CME-55 track-mounted drill rig. The equipment was supplied and operated by Pontil Drilling of Mount Albert, Ontario, who is a Ministry of the Environment, Conservation and Parks (MECP) licensed Water Well Contractor. The boreholes were advanced through the overburden using 125 mm outer diameter (O.D.) solid-stem augers and into the underlying bedrock using HQ size coring equipment at selected borehole locations (i.e., Boreholes BH23-F1 to BH23-F4). Soil samples were generally obtained at intervals of depth of 0.75 m and 1.5 m using a 50 mm O.D. split spoon sampler operated by an automatic hammer on the drill rig, performed in accordance with Standard Penetration Test (SPT) procedures (ASTM D1586). The results of the in-situ field tests (i.e. SPT “N” values) as presented on the Record of Borehole Sheets and in Section 4 are uncorrected.

The field work was observed by members of GEMTEC’s engineering and technical staff, who located the boreholes, arranged for the clearance of underground services, observed the drilling, sampling and in-situ testing operations, logged the boreholes, and examined the soil and bedrock samples. The samples were identified in the field, placed in appropriate containers, labelled and transported to our laboratory where the samples underwent further visual examination and geotechnical laboratory testing. The geotechnical laboratory tests were carried out in accordance with ASTM Standards, as appropriate. Classification testing (water content, Atterberg limits and grain size distribution) was carried out on selected soil samples and unconfined compressive strength testing was carried out on samples of the rock core by Geomechanica Inc., a specialized rock testing laboratory in Oakville, Ontario.

The borehole locations were recorded in the field using a hand-held GPS unit and confirmed by measuring relative distances to existing site features that appear on the site plans provided by CIMA. The ground surface elevations of the boreholes were interpolated from the digital elevation model (DEM) data provided by CIMA, and should be considered approximate.

3.2 Hydrogeological Investigation

3.2.1 Site Instrumentation

Monitoring wells were installed at two of the borehole locations (Boreholes BH23-F2 and BH23-F3). The monitoring wells were constructed using nominal 50 mm diameter, Schedule 40 polyvinyl chloride (PVC) pipe with a No. 10 machine slotted screen (0.01-inch slot). The annular space between the monitoring well screen and surrounding soils was backfilled with a silica sand pack to a maximum of 0.3 m above the top of the screen, and the remainder of the annular space was sealed with bentonite. Both monitoring wells were completed with protective 6-inch aluminum flushmount casings and anchored using concrete. The monitoring well installation details are tabulated in Table D-1, Appendix D.

3.2.2 Hydraulic Response Testing

In-situ hydraulic response testing was carried out on August 28, 2023, in the monitoring wells to estimate the bulk horizontal hydraulic conductivity (K_b) of the overburden and bedrock adjacent to the screened intervals. The testing consisted of creating an instantaneous change either through rapid well purging by removing a known volume of water or by removing a solid PVC slug from the water column, followed by recording the time taken for the water level to return to static conditions (i.e., rising head test). The data were analyzed using the Bouwer and Rice (1976) solution. Sheets summarizing the test data, analysis interval, input parameters and estimated bulk hydraulic conductivity for the tests are provided in Appendix E.

4.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

4.1 Regional Geology

This Site is located within the Peterborough Drumlin Field physiographic region, as delineated in The Physiography of Southern Ontario (Chapman and Putman, 1984), which extends from Lake Simcoe eastward to the Belleville area. The site is just north of the physiographic region known as the Schomberg Clay Plains, a topographic basin along the northern slope of the Oak Ridges Moraine that contains deep deposits of stratified clay and silt.

The surficial soils in the Peterborough Drumlin Field generally consist of drumlinized clayey or sandy till. Localized deposits of silt, clay and peat can be found in the low-lying areas between drumlins.

The overburden in this area is underlain by limestone bedrock of the Lindsay Formation, part of the Simcoe Group, consisting of gray to greenish gray, fine-grained, argillaceous limestone in beds from about 1 inch to 2 feet thick; and includes shale partings as much as 2 inches thick along most bedding planes.

4.2 Subsurface Conditions

As previously indicated, the soil and groundwater conditions identified in the boreholes are given on the Record of Borehole Sheets in Appendix C. The Record of Boreholes indicate the subsurface conditions at the specific borehole locations only. Boundaries between zones on the Record of Boreholes are often not distinct, but rather are transitional and have been interpreted from drilling observations. The precision with which subsurface conditions are indicated depends on the method of drilling, the frequency and recovery of samples, the method of sampling, and the uniformity of the subsurface conditions. Subsurface conditions at locations other than the boreholes may vary from the conditions encountered in the boreholes, both laterally and with depth.

The groundwater conditions described in this report refer only to those measured at the place and time of observation. Seasonal and annual fluctuations should be anticipated.

The soil and bedrock descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil and bedrock involves judgement and GEMTEC does not guarantee descriptions to be exact but infers accuracy to the extent that is common in current geotechnical practice.

The subsurface soil conditions at the site generally comprise of near-surface topsoil or asphalt underlain by a fill layer of silty sand to sand, which is underlain by native deposits of silty sand to sand, with peat, organic silt and gravel/cobble layers in isolated locations. The following presents an overview of the subsurface conditions encountered in the boreholes advanced during this investigation.

4.2.1 Topsoil and Organic Materials

Topsoil was encountered at the ground surface in Boreholes BH23-F2, BH23-F3 and BH23-F4. The topsoil extended to depths ranging from approximately 80 mm to 150 mm below ground surface (bgs). Materials designated as topsoil in this report were classified solely based on visual and textural evidence. Testing for organic content, pH, acidity, alkalinity and nutrients, was not carried out. Accordingly, materials classified as topsoil herein cannot necessarily be relied upon for the support and growth of landscaping vegetation without supplementary soil fertility testing.

Organic deposits were also encountered interlayered within and as past of the matrix the silty sand to sand deposit in Borehole BH23-F3 (peat) and underlying the near-surface sand deposit in Borehole BH23-F4 (organic silt). The organic deposits were encountered at depths of about 0.6 m and 0.2 m in Boreholes BH23-F3 and BH23-F4, respectively, and extended to depths of 2.1 m and 0.3 m. The natural water content measured on the sample of the organic material was approximately 27 percent.

4.2.2 Asphalt

Asphalt was observed at the surface of Boreholes BH23-P1 and BH23-P2 with an approximate thickness ranging from 50 mm to 70 mm.

4.2.3 Granular Fill Materials

Granular (non-cohesive) fill materials were encountered at existing ground surface in Borehole BH23-F1, underlying the surface asphalt in Boreholes BH23-P1 and BH23-P2, and underlying the topsoil in Borehole BH23-F2. The fill material is predominantly comprised of non-cohesive soils ranging from silty sand to sand (some silt) to silty sand and gravel. The fill material was present at surface or underlying the topsoil and was fully penetrated in all boreholes where encountered, extending to depths ranging from about 2.3 m to 4.7 m bgs.

In Borehole BH23-F2, practical drilling auger refusal was encountered at a depth of about 3.2 m bgs and the drilling advancement method was switched from augers to coring. Upon coring advancement from about 3.2 m and 4.3 m bgs, no samples were recovered, indicating a potentially predominantly cobble and / or bounder fill layer. Below approximately 4.3 m bgs, a layer or piece of concrete was recovered in the drilling core barrel.

The SPT “N”-values measured within the non-cohesive fill layers ranged from 10 to 63 blows per 0.3 m of penetration, indicating a compact to very dense state of compactness. The natural water content measured on samples of the fill layers generally ranged from approximately 2 percent to 11 percent.

Grain size distribution tests were undertaken on five selected samples of the fill materials. The results are provided in Appendix F and are summarized in Table 4.1.

Table 4.1 – Summary of Grain Size Distribution Test (Fill)

Location	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt / Clay (%)
BH23-F1	2	0.8 – 1.4	42	48	10
BH23-F2	2	0.8 – 1.4	18	69	13
BH23-F2	5	3.1 – 3.2	21	57	23
BH23-P1	1	0.0 – 0.6	16	73	11
BH23-P2	2	0.8 – 1.4	43	50	7

*Total content may not equal 100% due to rounding

4.2.4 (SP-SM) Silty Sand to Sand

Native deposits of silty sand to sand, some silt, were encountered in Borehole BH23-F1 underlying the fill layers, interlayered with the peat deposit in Borehole BH23-F3, and in Boreholes BH23-F4, BH23-P1 and BH23-P2 underlying the topsoil / fill materials. The silty sand to sand deposits were encountered at depths ranging from about 0.1 m to 2.3 m bgs and were observed to have a thickness ranging between about 0.1 m and 3.0 m.

The SPT "N"-values measured within the sand deposits ranged from 5 blows to 81 blows per 0.3 m of penetration, indicating these soils are in a loose to very dense state of compactness. The natural water content measured on samples of the sand deposit are between about 7 percent and 13 percent.

4.2.5 (GM) Silty Sand and Gravel

A native deposit of silty sand and gravel was encountered in Borehole BH23-F4 underlying the organic silt layer, at a depth of about 0.3 m below ground surface and extended to a depth of about 2.4 m bgs.

SPT "N"-values measured within the gravel deposits are 3 blows and 15 blows per 0.3 m of penetration, suggesting a very loose to compact state of compactiveness. The natural water content values measured on samples of the cohesive glacial till ranged from approximately 9 percent to 12 percent.

A grain size distribution test was undertaken on a sample of the gravel deposit. The results are provided in Appendix F and are summarized in Table 4.2

Table 4.2 – Summary of Grain Size Distribution Test (Silty Gravel)

Location	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt / Clay (%)
BH23-F4	2	0.8 – 1.4	48	30	22

4.2.6 Limestone Bedrock

Limestone bedrock was encountered, and core samples were recovered, at depths between approximately 2.4 m and 4.7 m bgs. The bedrock is generally described as highly to slightly weathered, thinly bedded, fine grained limestone with shale layers/seams.

The rock quality designation (RQD) was measured on the cores to generally be between zero and 72 percent. Based on the RQD, the rock is considered to range between poor and fair quality, in accordance with Table 3.10 in CFEM (2006). The Total Core Recovery (TCR) is generally between 44 percent and 100 percent. The Solid Core Recovery (SCR) is generally between 10 percent and 100 percent.

Photographs of the recovered bedrock core are presented in Figures 1 to 4 in Appendix G.

Unconfined Compression Strength (UCS) testing was conducted on five (5) selected samples of the bedrock. Based on the laboratory UCS tests (ASTM D7012), and in accordance with Table 3.5 in CFEM (2006), the limestone bedrock is generally classified as weak (R2, 5 MPa < Uniaxial Compressive Strength (UCS) < 25 MPa) to strong (R4, 50 MPa < Uniaxial Compressive Strength (UCS) < 100 MPa). The results of the UCS tests are shown on the Record of Borehole Sheets Appendix C and the Rock Laboratory Test Result reports are provided in Appendix F.

4.2.7 Groundwater Depths and Elevations

Details of the monitoring well installations are summarized in Table D-1, Appendix D. Groundwater level readings were taken in the two monitoring wells installed in Boreholes BH2-F2 and BH23-F3 on three events (August 28, September 5, and September 11, 2023). The groundwater levels ranged from approximately 1.7 m bgs (or Elevation 247.7 m above mean sea level (amsl)) in Borehole BH23-F2 to 0.8 m bgs (or Elevation 246.8 m amsl) in Borehole BH23-F3 during the last event on September 11, 2023. The groundwater depth and elevation data are provided in Table D-2, Appendix D. The groundwater levels were measured relative to the top of the PVC standpipe at each monitoring well location. The ground surface elevation at each monitoring well was estimated from the DEM interpolation provided by CIMA. The corresponding elevation of the top of each PVC standpipe was estimated by measuring the stick-down distance by hand. Accordingly, the groundwater elevations should be considered as approximate only and interpreted with caution. The groundwater conditions described in this report refer only to those measured at the place and time of observation. Seasonal and annual fluctuations should be anticipated.

4.2.8 Hydraulic Response Test Results

The results of the hydraulic response testing carried out in the monitoring wells are presented in Appendix E. The hydraulic conductivity values estimated from the rising head tests are presented in Table D-3, Appendix D. The following provides a summary of the test results:

Table 4.3 – Summary Hydraulic Conductivity Estimates

Unit	No. of Tests	Minimum K_b [m/s]	Maximum K_b [m/s]	Geomean K_b [m/s]
Silty Sand Fill, Concrete, Limestone	1	1×10^{-3}	1×10^{-3}	1×10^{-3}
Peat, Silty Sand, Limestone	1	7×10^{-6}	7×10^{-6}	7×10^{-6}

Notes: K_b = bulk hydraulic conductivity; m/s = metres per second

The hydraulic conductivity of the silty sand fill and limestone was approximately 1×10^{-3} m/s (Borehole BH23-F2). This hydraulic conductivity value is within the literature range for fractured limestone of 10^{-6} to 10^{-2} m/s (Freeze and Cherry, 1979). Given the absence of core

recovery from approximately 3.2 m to 4.3 m bgs, and about 60 percent core recovery from approximately 4.3 m to 5.7 m bgs at this location (see Appendix C), void spaces (e.g., between cobbles and boulders, or large bedrock fractures) may have affected this test result.

The hydraulic conductivity of the peat, silty sand, and limestone was 9 x 10^{-6} m/s (Borehole BH23-F3). This hydraulic conductivity value is within the literature ranges for silty sand of 10^{-7} to 10^{-5} m/s (Fetter, 1994) and fractured limestone of 10^{-6} to 10^{-2} m/s (Freeze and Cherry, 1979). The hydraulic conductivity value is higher than expected for peat, with a literature range for medium-decomposed peat of 10^{-7} to 10^{-6} m/s (Kaczmarek et al., 2023).

5.0 DISCUSSION

The following sections of the report provide guidance on the geotechnical engineering and design aspects of the project based on our interpretation of the boreholes advanced as part of the site investigation. Preliminary hydrogeological comments on construction dewatering needs and permitting are also provided. It is stressed that the information in the following sections is provided for the guidance of the designers and is intended for this project only. If the project is modified in concept, location or elevation, or if the project is not initiated within eighteen months of the date of the report, GEMTEC should be given an opportunity to confirm that the recommendations are still valid. Once the detail design drawings are available GEMTEC should be given the opportunity to review the drawings and confirm that the recommendations in this report have been interpreted correctly and incorporated into the design.

Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety, and equipment capabilities. GEMTEC will not assume any responsibility for construction-related decisions made by contractors on the basis of this report.

The professional services retained for this report include only the geotechnical and hydrogeological aspects of the subsurface conditions at this site. The presence or implications of possible surface and/or subsurface contamination resulting from previous uses or activities of this site or adjacent properties, and/or resulting from the introduction onto the site from materials from offsite sources are outside the terms of reference for this report and are addressed under separate cover.

Based on the preliminary General Arrangement (GA) drawing in progress as provided by CIMA dated May 25, 2023, and follow up discussions with the CIMA design team, the proposed replacement bridge will consist of a two-span haunched steel girder and concrete deck structure with an overall length of about 96 m supported on shallow foundations. The proposed bridge will be about 14 m wide to accommodate a single lane in each direction with raised concrete sidewalks.

Based on the GA, it is understood that the proposed grade at the west and east abutments for the replacement structure will be at approximately Elevations 257.2 m and 254.0 m, respectively. The proposed grade at the north and south abutments will require embankments about 5.4 m and 5 m in height, respectively.

5.1 Design Considerations

5.1.1 Consequence and Site Understanding Classification

The proposed bridge will carry medium volumes of traffic that is assumed to not be essential to post-disaster recovery (e.g., lifeline) and/or having large societal or economic impacts. In accordance with Section 6.5 of the 2019 *Canadian Highway Bridge Design Code* CAN/CSA S6-19 and its Commentary (CHBDC 2019), the proposed bridge and its foundation system is considered to be classified as having a "typical consequence level" associated with exceeding limits states design. In addition, given the level of foundation investigation completed to date at this location in comparison to the degree of site understanding in Section 6.5 of the CHBDC (2019), the level of confidence for design is considered to be a "typical degree of site and prediction model understanding." Accordingly, the appropriate corresponding ULS and SLS consequence factor, ψ, from Table 6.1 and geotechnical resistance factors, ϕ_{gu} and ϕ_{gs}, from Table 6.2 of the CHBDC have been used for design.

5.1.2 Seismic Design

The new bridge is in Seismic Performance Category (SPC) 1 and therefore seismic analysis of bridges in SPC 1 is not a requirement of the CHBDC (Clause 4.4.5.1). However, design forces for restraining elements and bridge support lengths must meet the minimum requirements as outlined in CHDBC Clauses 4.4.10.2 and 4.4.10.5.

5.1.2.1 Seismic Site Classification

The subsurface conditions for seismic site characterization were assessed based on the results of the field investigation and in situ testing. Based on the energy-corrected average penetration resistance, $\overline{N}_{60}$ below the founding level, the site may be classified as Site Class C if founded in the overburden soils with more than 3 m of overburden between the foundations and bedrock, and in accordance with Table 4.1 of the 2019 CHBDC, in the absence of any geophysical testing, or Site Class B if the foundations are founded on the limestone bedrock. Geophysics testing, if carried out, may provide a more favourable Site Class designation.

The 2019 CHBDC states that the seismic hazard values associated with the design earthquakes should be those established for the National Building Code of Canada (NBCC) by the Geological Survey of Canada (GSC). The current seismic hazard maps (referred to as the 5th generation seismic hazard maps) were developed by the GSC and were made available for public use in December 2015.

5.2 Foundations Options

Given the presence of near surface competent native soil deposits, and bedrock at a relatively shallow depth below ground surface, the bridge abutments and pier may be founded on shallow foundations on the native soils or bedrock. Given the relatively shallow depth to bedrock, deep foundations that would allow for integral abutments would require significant bedrock excavation and backfilling with engineered fill prior to pile driving, and this option is considered to be not practical at this site.

At the centre pier, if excavation to the top of bedrock is not considered to be practical due to the shoring and dewatering requirements, piles driven to bedrock, or caissons drilled into bedrock are also considered to be feasible options.

5.2.1 Shallow Foundations

The centre pier, abutments and retaining walls for the new bridge may be founded on conventional spread/strip footings founded on the competent native soils or limestone bedrock at the depths given below.

At the west abutment, competent native soils were encountered at a depth of about 2.3 m below ground surface. For strip and/or spread footings founded at this depth, a factored Ultimate Limit States geotechnical resistance (ULS) of 350 kilopascals (kPa) and a factored Serviceability Limit States (SLS) geotechnical reaction of 200 kPa may be used for design, based on an approximately 6-metre-wide footing.

At the east abutment, it is anticipated that the foundations will need to be placed at a depth of 2.4 m below ground surface, or deeper, and on/within the bedrock, due to the presence of the overlying organic materials. Details regarding shallow foundations are discussed in further detail below.

At the pier, existing fill materials with variable composition and density were encountered to a depth of about 4.7 m (at the top of bedrock). As no records of the quality or construction / placement of the fill is available, these materials will require removal and replacement with engineered fill, unshrinkable fill, or mass concrete up to subgrade level. If records could be provided with regards to the source of the fill material and compaction testing results during placement, some of the fil material could potentially be left in place, in conjunction with additional inspection/verification during construction. The bearing resistance will depend on the material used to backfill the excavation to subgrade level. If properly placed and compacted OPSS1010 Select Subgrade Material is used for the engineered fill, a factored ULS resistance of 300 kPa and a factored serviceability geotechnical reaction of 150 kPa may be used for design, based on an approximately 6-metre-wide footing. If properly placed and compacted OPSS1010 Granular A or unshrinkable fill is used for the engineered fill, a factored ULS resistance of 600 kPa and a

factored serviceability geotechnical resistance of 500 kPa may be used for design, based on an approximately 6-metre-wide footing.

If an engineered fill or unshrinkable fill pad is used to replace the existing fill material, the fill pad should be constructed to 0.3 m beyond the footprint of the pier foundation and should extend outward and downward at a slope of 1 horizontal to 1 vertical to the bottom of the existing fill. The fill should be placed in loose lift thicknesses not exceeding 300 mm and compacted to a minimum of 100 percent of the materials Standard Proctor Maximum Dry Density (SPMDD).

Alternatively, shallow foundations at both abutments and the pier could be constructed bearing directly on the undisturbed competent limestone bedrock. If excavation in bedrock is required to extend below the highest founding elevations to remove all loose, shattered and/or fractured rock within the area of the footing, or where the bedrock excavation results in the creation of steps or troughs in the bedrock, the founding stratum could be levelled or raised using mass concrete. In this case the mass concrete should be of the same composition and compressive strength as the concrete used for the footing construction.

Strip footings (approximately 2 m wide) constructed on the properly prepared bedrock excavation base may be designed based on a factored ultimate geotechnical resistance ULS of 6,000 kPa. The factored serviceability geotechnical reaction for 25 mm of settlement will be greater than the factored ultimate geotechnical resistance; and as such, the factored ultimate geotechnical resistance will govern for this foundation type.

The factored ultimate geotechnical resistances provided above are given based on a geotechnical ULS resistance factor of 0.5, and for loads that will be applied perpendicular to the surface of the footings. Where the load is not applied perpendicular to the footing, inclination of the load should be taken into account in accordance with Section 6.10.4 of the CHBDC (2014).

All footing subgrades should be inspected by a Foundation Engineer, in accordance with OPSS 902 (Excavating and Backfilling Structures), Special Provision SP109S12 and NSSP FOUN0003, to check that all existing fill(s), concrete, organics or otherwise deleterious materials have been removed. Further, following excavations into the bedrock, it will be necessary to clean, scale and remove all loose, shattered and/or fractured rock within the area of the footing to ensure proper concrete bond to the bedrock.

The elevation of the underside of the footing should be maintained at a minimum depth below finished grade of approximately 1.6 m to provide adequate frost protection. Erosion / scour protection should also be considered in the design of the footings by a hydraulic engineer (e.g., by providing additional sacrificial cover or erosion protection).

5.2.2 Resistance to Lateral Forces/Sliding Resistance

Resistance to lateral forces/sliding between the concrete spread/strip footings and the subgrade should be calculated in accordance with Section 6.10.4 of CHBDC 2019. Assuming that the founding soils are not loosened or disturbed during excavation and footing construction, the unfactored coefficient of friction (tan φ') values between the cast-in-place concrete footings and the inspected and approved subgrade may be taken as follows:

Table 5.1 – Coefficient of Friction (tan φ') Values

Subgrade Material	Coefficient of Friction, tan φ'
Cast-in-place footing or working slab on compacted Granular 'A'	0.6
Cast-in-place footing or working slab on compacted SSM	0.35
Cast-in-place footing or working slab on native silty sand to sand	0.35
Cast-in-place footing or working slab on Limestone Bedrock	0.7

5.2.3 Deep Foundations

5.2.3.1 Driven Piles

In order to reduce excavation and dewatering requirements, consideration can be given to supporting the pier on steel HP 310x110 piles, or closed-end, concrete-filled, 324 mm (12 ¾ in.) diameter steel pipe piles having a minimum wall thickness of 9.5 mm (3/8 in.) driven to found in the limestone bedrock. Depending on the bridge geometry and requirements for lateral resistance of the piles, it may be necessary to form sockets in the bedrock by coring and/or churn drilling to allow the piles to be placed within and concreted into the bedrock.

It has been assumed that if pre-augered socketed pile foundations are adopted at the centre pier, the underside of the pile cap will be at approximate Elevation 248.2 m to provide the minimum founding depth of 1.6 m for frost protection purposes. The structural designers should assess whether the resulting pile lengths to top of bedrock at about Elevation 244.7 m are sufficient from a structural perspective. If longer pile lengths are required from a structural perspective, deeper pre-augering/coring would be needed to penetrate further into the bedrock.

The limestone bedrock is weak to strong (with unconfined compressive strengths typically in the range of 25 MPa to 65 MPa), and so sockets would have to be advanced into the rock by churn drilling or rock coring.

For HP310x110 piles founded in the bedrock, the factored ULS axial resistance is anticipated to govern the design and a value of 1800 kN may be used for design. A heavier steel H-pile section HP310x132 could also be used in order to assist with seating the pile. A factored ultimate geotechnical resistance at ULS of 1,900 kN may be used for design for this larger pile section,

and again, the factored ultimate geotechnical resistance will govern the design, rather than the factored serviceability geotechnical resistance at SLS.

As encountered in the borehole advanced at the pier, cobbles and/or boulders may be encountered within the fill layers, which may affect the installation of deep foundations and/or protection system elements. It is recommended that bearing points (such as Titus standard "H" point or equivalent) be used on all steel H-piles to facilitate driving within layers / deposits that may contain cobble / boulders.

5.2.3.1.1 Set Criteria and Pile Driving Note

Pile installation should be carried out in accordance with OPSS 903 (Deep Foundations). For piles driven to bedrock, set criteria are highly dependent on pile driving hammer type and the selected pile. The set criteria can be established through a variety of methods, including empirical correlations and wave equation analyses, at the time of construction once the hammer and pile types are known. The criteria also needs to be set to avoid overdriving and possibly damaging the pile. Based on our experience, consideration should be given to the following preliminary criteria for piles driven to bedrock:

- The piles should be driven to an initial set equal to or greater than 10 blows per 25 mm of penetration (unless abrupt peaking occurs) using a hammer with a rated energy of about 50 kilojoules, but not exceeding 60 kilojoules.
- When "refusal" is met at bedrock, it is a generally accepted practice to reduce the hammer energy after abrupt peaking is met in the bedrock, and then to gradually increase the energy over a series of blows to seat the pile in the bedrock.
- A final set of no less than 10 blows per maximum 25 mm of penetration should be obtained at the maximum hammer energy. Provision should be made to re-tap all piles to confirm the set after adjacent piles have been driven.

5.2.3.1.2 Resistance to Lateral Loads

Resistance to lateral loading for the centre pier may be derived using vertical piles, with enhanced support offered by inclined (battered) piles, if required. For vertical piles, the resistance to lateral loading will be derived solely from the soil in front of the piles, whereas inclined piles derive lateral resistance from the soil in front of the piles as well as the horizontal component of the axial load present in the inclined pile.

Where ground conditions are generally competent and the lateral loads on piles are relatively small such that the maximum lateral pile deflections will be relatively small, the resistance to lateral loading in front of a single pile can be estimated using subgrade reaction theory (as outlined below). However, the response of a pile to lateral loads is highly nonlinear and methods that assume linear behavior (such as subgrade reaction theory) are most appropriate where the maximum pile deflections are less than 1 percent of the pile diameter, where the loading is static

(no cycling) and where the pile material is linear as per the Canadian Foundation Engineering Manual (CFEM, 2006). Where these conditions are not met, and/or where required for the structural engineering model, the non-linear lateral behavior of the soil should be considered by the use of P-y curves, which can be provided if required.

The factored serviceability geotechnical response of the soil in front of the piles under lateral loading at this site may be calculated using subgrade reaction theory suggested in CHBDC (2014) Commentary (Section C6.11.2.2), where the coefficient of horizontal subgrade reaction, k_h, (kPa/m) is based on the equations given below, as described by Terzaghi (1955) and the Canadian Foundation Engineering Manual (CFEM 1992).

For non-cohesive soils:

$$k_h = \frac{n_h Z}{B}$$

Where: n_h is the constant of horizontal subgrade reaction (kPa/m), as given below;
Z is the depth (m) of pile below ground surface; and,
B is the pile diameter/width (m)

For cohesive soils:

$$k_h = \frac{67 s_u}{B}$$

Where: s_u is the undrained shear strength of the soil (kPa); and,
B is the pile diameter/width (m)

The following values of n_h (Terzaghi, 1955) and s_u may be incorporated into the calculations of horizontal subgrade reaction (k_h) for structural analyses for a single vertical pile. The values provided reflect the variability in the subsurface conditions, the soil properties, the approximate nature of the analysis and the non-linear nature of the soil behaviour (such that k_h is a function of deflection).

Foundation Element	Soil Unit	Elevation Interval (m)	n_h (kPa/m)	s_u (kPa)
Centre Pier	Compact silty sand to sand fill	249.3 to 247.3	4,000	--
	Dense silty sand to sand fill	247.3 to 244.7	7,500	--

Both the structural and geotechnical resistances of the piles should be evaluated to establish the governing case at ULS. At SLS, the horizontal reaction of the piles will be controlled by deflections and the horizontal resistance of the pile should be calculated based on the coefficient of horizontal subgrade reaction (k_h) of the soil as discussed above. The SLS reaction should be taken as that corresponding to a horizontal deflection of 10 mm at the underside of the pile cap (CHBDC (2014) Commentary Section 6.11.2.2).

Group action for lateral loading should be considered when the pile spacing in the direction of the loading is less than six to eight pile diameters between rows of driven steel H-piles. Group action

can be evaluated by reducing the coefficient of horizontal subgrade reaction in the direction of loading by a reduction factor, R (NAVFAC DM7.2, 1986) as follows:

Pile Spacing in Direction of Loading (D = Pile Diameter)	Subgrade Reaction Reduction Factor, R
8D	1.00
6D	0.70
4D	0.40
3D	0.25

The subgrade reaction reduction factor should be interpolated for pile spacings in between those provided in the above summary. Reduction for group effects is negligible when the centre-to-centre pile spacing exceeds three pile diameters measured in the direction perpendicular to loading.

5.2.3.1.3 Frost Protection

All pile caps should be provided with a minimum of 1.6 m of conventional soil cover for frost protection, in accordance with OPSD 3090.101 (Foundation Frost Penetration Depths for Southern Ontario) or equivalent thickness of insulation below the cap. As a guide, the MTO has adopted a 25 mm thickness of rigid polystyrene foam insulation as equivalent to a 0.3 m reduction in conventional soil cover.

5.2.3.2 Caissons (Centre Pier)

Drilled shaft foundations could also be considered for support of the centre pier. Drilled shafts should be socketed a minimum of 2 m into the good quality limestone bedrock.

If caisson foundations are adopted, a temporary liner and a head of water/drilling slurry will be required to support the overburden soils during construction and balance groundwater pressures, to minimize disturbance to the side walls and to control base disturbance/basal heave. In addition, placement of concrete by tremie methods would be required. After initial placement of concrete at the bottom of the drilled shaft, the tremie discharge point should be maintained a minimum of 1 m below the surface of the wet concrete during placement. It is recommended that a provision be included in the Contract Documents to address the need for control of the ground and groundwater during drilled shaft construction.

For drilled shafts designed for end-bearing and shaft friction combined, the performance of the caissons in compression will depend to a large degree upon the final cleaning and verification of the condition of the subgrade rock at the base of the caisson. For caissons acting in compression, the base of each caisson excavation must be cleaned to remove all loose cuttings to ensure that the tremied concrete is in intimate contact with the competent limestone bedrock. The inspection of the base of the rock sockets can be accomplished after flushing and cleaning of the base by means of a Shaft Inspection Device (SID) such as a video camera. Should the camera inspection

indicate that loosened/unacceptable soil or rock is present at the base the caisson, the socket base would need to be re-cleaned and re-inspected. A geotechnical engineer must confirm that the conditions encountered are consistent with the information obtained from the boreholes and that the required minimum socket geometry and cleanliness has been obtained. Immediately following cleaning and inspection of the rock socket the concrete must be tremied into the caisson.

For caissons founded a minimum of 2 m into the good quality limestone, a factored ULS geotechnical resistance of 3,750 kPa at the pile tip per caisson may be used for design for caissons between 0.75 m and 1.5 m diameter. The factored serviceability geotechnical reaction at SLS for 25 mm of settlement (for the length of caissons required at this site) will be greater than the factored ULS geotechnical resistance at ULS, as such, the factored geotechnical resistance at ULS will govern for this foundation type.

5.2.3.2.1 Resistance to Lateral Loads

The geotechnical resistance to lateral loading for the caissons should be calculated in accordance with Section 5.2.3.1 above, using the horizontal subgrade formulas and parameter values presented therein.

5.3 Lateral Earth Pressures for Design

The lateral pressures acting on the bridge abutments and associated wingwalls/retaining walls will depend on the type and method of placement of the backfill materials, the nature of the soils behind the backfill, the freedom of lateral movement of the structure and the drainage conditions behind the walls. The following recommendations are made concerning the design of the abutments, in accordance with the CHBDC.

- Select, free-draining granular fill meeting the specifications of OPSS.PROV 1010 Granular A or Granular B Type II should be used as backfill behind the abutments and walls. This fill should be placed and compacted in accordance with OPSS.PROV 501. Longitudinal drains and weep holes should be installed to provide positive drainage of the granular backfill. Other aspects of the abutment granular backfill requirements with respect to subdrains and frost taper should be in accordance with OPSD 3101.150 and 3190.100.
- A compaction surcharge equal to 12 kilopascals should be included in the lateral earth pressures for the structural design of the abutment walls in accordance with CHBDC Figure 6.6. Compaction equipment should be used in accordance with OPSS.PROV 501.
- The granular fill may be placed either in a zone with a width equal to at least 1.2 m behind the back of the stem (Case a from Commentary on CHBDC Figure C6.20) or within the wedge-shaped zone defined by a line drawn at a 1 horizontal to 1 vertical slope extending up and back from the rear face of the footing (Case b from Commentary on CHBDC Figure C6.20).

- For Case a, the pressures are based on the proposed embankment fill materials and the following parameters (unfactored) may be used assuming the use of Select Subgrade Material (SSM).

Soil unit weight:	Coefficient of lateral earth pressure:	
20 kN/m³	At rest, K_o	0.50

- For Case b, the pressures are based on the granular fill as placed and the following parameters (unfactored) may be assumed:

Material	Soil unit weight:	Coefficients of lateral earth pressure:	
		Active, K_a	Passive, K_p
Granular A	22 kN/m³	0.27	3.7
Granular B Type II	21 kN/m³	0.31	3.3

- If the wall support and superstructure allow lateral yielding of the stem, active earth pressures may be used in the geotechnical design of the structure. If the wall support does not allow lateral yielding, at-rest earth pressures should be assumed for geotechnical design.
- The movements required to fully mobilize passive pressure or resistance are much larger than those required to mobilize active pressure. In practice, movements may not be sufficient to mobilize the full passive resistance.
- A resistance factor equal to 0.5 should be applied to the calculated total passive resistance in accordance with Table 6.2 of the CHDBC.

It should be noted that the above design parameters assume level backfill and ground surface behind the wall. The lateral earth pressure coefficients should be adjusted if there is sloping ground at the back of the wall.

5.4 Foundation Construction Considerations

5.4.1 Shallow Foundations

The founding soils are sensitive to disturbance and loosening due to water seepage and/or ponding and construction equipment or foot traffic when moist to wet. Placement of a concrete working slab (100 mm thick, 20 MPa concrete) is recommended at the base of the excavations for the footing areas. Exposure without protection from the working slab may result in loosening or softening of the founding soils. The cleaned excavation base should be inspected by qualified geotechnical personnel prior to placing the working slab. It is recommended that the footing

excavations be carried out such that the final 0.5 m of excavation is completed with the geotechnical personnel on site and the working slab placed immediately after footing inspection.

The footing subgrade should be inspected, in accordance with OPSS 902 to check that all existing fill, organics and any other deleterious materials have been removed. Furthermore, if the excavations extend into bedrock, it will be necessary to clean, scale and remove all loose, shattered and/or fractured rock within the area of the footing to ensure proper concrete bond to the bedrock.

5.5 Approach Embankments

Based on the GA provided by CIMA, it is understood that the proposed grade at the west and east abutments for the replacement structure will be at approximately Elevations 257.2 m and 254.0 m, respectively. The proposed grade at the north and south abutments will require embankments about 5.4 m and 5 m in height, respectively above existing ground surface.

The following sections address subgrade preparation and embankment construction, global stability and anticipated settlements of the proposed approach embankments. The critical sections used in the analyses are located just behind the abutments where the embankments are highest at each side of the bridge. The piezometric conditions used in the analyses are based on the groundwater level as encountered during the subsurface site investigation.

5.5.1 Subgrade Preparation and Embankment Construction

Prior to construction of the approach embankments, all topsoil, organic soils and any loose/soft deleterious fill should be stripped from within the footprint of the embankments. The existing fill encountered in the vicinity of the west abutment in Borehole BH23-F1 are generally considered to be competent for support of the approach embankments. Existing fill materials remaining within the footprint of the approach embankments after stripping and site regrading operations, should be assessed for their suitability to remain in place through proof-rolling operations monitored by qualified geotechnical personnel at the time of construction.

The silty sand to sand and peat / organic deposits encountered in Borehole BH23-F3 (in the vicinity of the east abutment) should be completely removed and replaced with engineered fill prior to construction of the approach embankment. It is recommended that additional investigations including either test-pit excavations and/or shallow boreholes be carried out to define the limits of these organic deposits and volume of soil to be excavated.

From a geotechnical perspective, it is recommended that fill for construction of the approach embankments consist of granular fill or OPSS.PROV.1010 Select Subgrade Material (SSM). If there is a surplus of earth fill on the construction contract, or if there is a significant local source of earth fill at the time of construction, the use of earth fill may be considered for embankment construction; however, its suitability would be dependent on the quality of the source, including its plasticity and water content, and additional post-construction settlement may occur.

Fill materials should be placed and compacted in accordance with OPSS.PROV 501 (Compacting) and OPSS.PROV 206 (Grading).

To reduce surface water erosion on the granular embankment side slopes, topsoil and seeding as per OPSS 802 (Topsoil) and OPSS.PROV 804 (Seed and Cover) should be carried out as soon as possible after construction of the embankments. If this slope protection is not in place before winter, then alternate protection measures, such as covering the slope with straw, or gravel sheeting as per OPSS 511 (Rip Rap, Rock Protection and Granular Sheeting), should be carried out to reduce the potential for erosion and to reduce the potential for the requirement of remedial works on the side slopes in the spring prior to topsoil dressing and seeding.

5.5.2 Global Stability

Limit equilibrium slope stability analyses were performed using the commercially available program Slope/W (Version 10), produced by Geostudio, employing the Morgenstern-Price method of analysis. For all analyses, the factors of safety of numerous potential failure surfaces were computed in order to establish the minimum Factor of Safety. The Factor of Safety (FoS) is defined as the ratio of forces tending to resist failure to the driving forces tending to cause the failure. A target minimum FoS of 1.3 has been used for design of the temporary embankment side slopes, and a FoS of 1.5 for the design of the final embankment configuration as per Table 6.2 of CHBDC (2019) for the total stress (short-term undrained) and effective stress (long-term drained) condition, as applicable.

For embankments up to 5.4 m in height, with side slopes oriented no steeper than 2 horizontal to 1 vertical (2H:1V), the factor of safety for global stability will be greater than 1.3 in temporary/short-term conditions during construction, and greater than 1.5 in long-term/permanent conditions.

5.5.3 Settlement

To estimate the magnitude of the expected settlements under the proposed approach embankment loading, analyses were carried out at the critical sections of the proposed approach embankments using the commercially available program Settle3D (Version 4.0) produced by Rocscience Inc., combined with spreadsheet calculations where appropriate, using the Boussinesq stress distribution method.

The primary source of potential settlement is the immediate settlement of the native granular soils, assuming complete removal of the existing organic deposits (where present).

The immediate compression of the native cohesionless soil layers was modelled by estimating an elastic modulus of deformation based on the SPT “N”-values and using correlations proposed by Bowles (1984) and Kulhawy and Mayne (1990). These estimated values were compared with the typical range of expected values for similar soil types, as outlined in CHBDC (2006) and adjusted, as necessary.

The analysis indicates that the anticipated settlement of the approach embankments will be less that 25 mm at the critical embankment heights analysed, for properly constructed embankments as described above. As the site soils are non-cohesive in nature, the settlement is anticipated to occur during or immediately following embankment construction.

5.5.4 Retained Soil System (RSS) Walls

Based on the provided *Reinforced Earth Retaining Wall Elevation and Typical Sections* drawing (CIMA, June 2025), the west approach embankment will require retaining walls on both sides of the abutment. These retaining walls will be designed and constructed as RSS walls and will extend from the abutment wing walls westward. The detail design of the retaining walls is to be carried out by the Contractor's wall supplier. The following recommendations are provided as a guide to design the retaining walls, but the wall designer/supplier should examine the factual results of the geotechnical investigation and confirm the recommendations given below are applicable to their product. Further, it will be essential for qualified geotechnical personnel to carry out inspections during construction to confirm the soil conditions are consistent with the design assumptions

The front facing panels of the RSS walls should be supported on a footing constructed on a granular pad. The granular pad should consist of a minimum thickness of 0.3 m of compacted Granular 'A' material, which should extend at least 1 m beyond the outside edge of both sides of the facing footing, then outward/downward at an inclination of 1H:1V to a minimum thickness of 0.3 m or to the compact to dense native sand deposits, whichever is deeper.

5.5.4.1 Geotechnical Resistances

For the RSS facing panels supported on a 0.3 m wide footing constructed on a compacted granular pad as described above, a factored Ultimate Limit States geotechnical resistance (ULS) of 350 kPa and a factored Serviceability Limit States (SLS) geotechnical reaction of 200 kPa (for 25 mm of settlement) may be used for design.

5.5.4.2 Frost Protection

Based on MTO's *RSS Design Guidelines* (2008), the minimum soil cover to the underside of the levelling pad supporting the footings for the RSS facing panels should be at least 0.8 m or 40 percent of the frost depth (i.e., 1.6 m at this site), whichever is greater; and the minimum soil cover to the top of the levelling pad should be at least 0.5 m.

However, if annual wall movements resulting from freeze thaw cycles must be minimized, consideration should be given to providing the footings with a minimum 1.6 m of soil cover for frost protection as per OPSD 3090.101 *(Frost Penetration Depths for Southern Ontario*), as measured vertically and perpendicular from the face of the abutment slope to the edge of the underside of the footing.

5.5.4.3 Resistance to Lateral Loads/Sliding Resistance

Resistance to lateral forces/sliding resistance between the compacted fill of the RSS wall mass and the subgrade should be calculated in accordance with Section 6.10.4 of the *CHBDC* (2019). The coefficient of friction (tan φ'), between the compacted granular fill of the RSS wall and the new embankment fill may be taken as 0.60 (if the fill is expected to be comprised of earth fill or SSM) and 0.70 (if the embankment fill is expected to be comprised of granular fill).

5.5.4.4 Global Stability

As discussed in Section 5.5.2, a target minimum Factor of Safety of 1.5 is considered appropriate for design of the RSS walls for global stability. The global stability of the RSS walls is generally governed by the length of the reinforcing strips. Preliminary analysis indicates that reinforcing strip length equal to about 0.7 times the height of the wall will be required to maintain an adequate factor of safety. The global stability of the wall system should be checked once detailed design of the walls is complete.

The internal stability of a reinforced earth structure is to be designed and assessed by the proprietary product designer/manufacturer to ensure that the internal stability of the walls is acceptable.

5.6 Construction Considerations

5.6.1 Excavations and Groundwater Control

Excavations for the pier and abutment footings will extend through the existing fill materials and into the underlying native silty sand to sand and peat deposits or to the limestone bedrock. The groundwater levels encountered in the monitoring wells ranged from 0.8 m to 1.7 m bgs and between approximate Elevation 246.8 m and Elevation 247.7 m at Boreholes BH23-F3 and BH23-F2 in the vicinity of the east abutment and the centre pier, respectively, at the time of the groundwater level readings in late August to mid-September. Seasonal and annual fluctuations should be anticipated.

Care should be taken to direct surface water away from any open excavations and all temporary excavations should be carried out in accordance with the Occupational Health and Safety Act (OHSA) and Regulations for Construction Projects.

For excavations that extend below the groundwater table, significant groundwater inflow into the excavations may be expected and there is a potential for sloughing of excavation sideslopes and/or disturbance / boiling of the base of the excavations. In order to reduce the potential for instability of the sidewalls and base of the excavation in all areas, an external groundwater control system (e.g. well point or eductor dewatering systems, potentially in conjunction with a groundwater cut-off system like a sheet pile cofferdam at the pier location) is recommended to lower the groundwater level in the granular deposits to a minimum level of 1.0 m below the base of the excavation before the excavation is carried out.

The rate and volume required for dewatering will be dependent on the depth of the required excavations, the groundwater levels at the time of construction and the construction methods and staging chosen by the Contractor.

Dewatering should be undertaken by a specialist dewatering contractor who is an MECP-licensed Water Well Contractor. The design of the dewatering array should be based on the dewatering contractor's independent assessment of site conditions, and on their experience and equipment.

The generally compact sandy soils and existing fill at the site are classified as "Type 3" soils and the organic/peat deposits are classified as a "Type 4" soils under the OH&S Act.

Where the side slopes of excavations are required to be steepened to limit the extent of the excavation, then some form of excavation side support may be required. Some trench excavations could be carried out using a vertically excavated, supported excavation (using a properly-engineered trench liner box for protection, certified by an experienced engineer); or by a supported (sheeted) excavation if conditions warrant so; such as in wet areas and/or in close proximity to adjacent underground services.

5.6.2 Temporary Construction Dewatering Permitting

Excavations below the water table of variable dimensions and in variable soil conditions, including excavations for the pier and abutment footings, will likely require some form of groundwater control (as noted above). Details of the SWMP were not available at the time this report was submitted and as such, GEMTEC cannot comment on groundwater control required for the SWMP.

The proposed excavation for the bridge pier may extend to top of bedrock, which is approximately 4.7 m bgs (or Elevation 244.67 m amsl) at this location (i.e., Borehole BH23-F2 as provided in Appendix C). The very high hydraulic conductivity estimated from the test at Borehole BH23-F2 may have been the result of the intersection of the screened interval with voids in the fill or wide fractures in the bedrock (see Section 3.2.2). Assuming the hydraulic conductivity is representative, and given approximate dimensions for the pier excavation of 15 m long by 6 m wide and the Scugog River acting as a constant head boundary, the steady state dewatering rate is estimated to significantly exceed the 50,000 L/day Environmental Activity and Sector Registry (EASR) threshold by a factor in the order of 248 to 496 times. Higher volumes would initially be required to remove groundwater from storage within the dewatering zone of influence. Effective July 1, 2025, the MECP amended *Ontario Regulation 63/16* under the *Environmental Protection Act* to change the temporary construction dewatering permitting requirements. A self-registered EASR is now required for all temporary construction dewatering of greater than 50,000 L/day and there is no longer an upper water taking limit. This replaces the previous requirement to apply for a Category 3 Permit to Take Water for temporary construction dewatering of greater than 400,000 L/day.

It is estimated that conventional dewatering for both the west and east abutment excavations would exceed the 50,000 L/day EASR threshold due to the proximity to the Scugog River.

If voids or wide fractures are present, they may be hydraulically connected to the Scugog River. The pumping and management of large volumes in proximity to the river and/or the indirect taking of surface water from the Scugog River are not desirable, and an alternate footing design or cut-off wall are recommended to significantly reduce groundwater inflow or eliminate the need for pumping. This recommendation applies to both the bridge pier and abutments.

It is recommended to anticipate dewatering rates for the project in excess of 50,000 L/day, and to register for an EASR, if measures to significantly reduce groundwater inflow or eliminate the need for pumping are not utilized. Under the EASR, a qualified professional must prepare a Water Taking Report and Discharge Plan for the project, and subsequently the water taking may be self-registered on the EASR website. Groundwater and surface water sampling should be carried out once the site design has progressed to characterize quality, select a discharge option, and prepare a discharge plan. Prior to groundwater discharge to ground surface or a sewer system, notification to and/or approvals from Kawartha Conservation and/or the City of Kawartha Lakes may be required.

These findings should be re-evaluated as site designs progress, the final excavation dimensions are available, and construction methods and schedules are developed.

5.6.3 Corrosivity Considerations

Consideration should be given to performing analytical testing on the fill and native soils to assess the potential for corrosion of steel and sulphate attack on concrete. Alternatively, allowance should be made within the design and/or contract specifications for protection of concrete and steel elements which will be in contact with the fill and native soil materials.

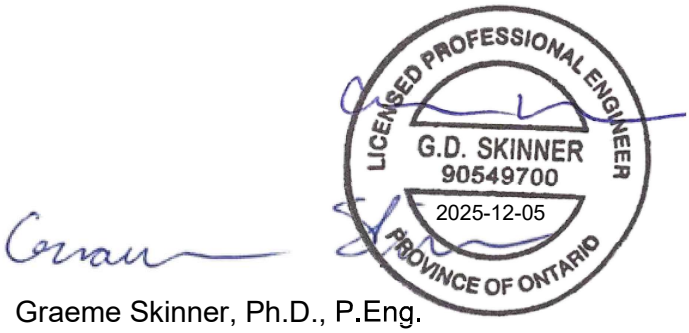
6.0 CLOSURE

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

Regards,

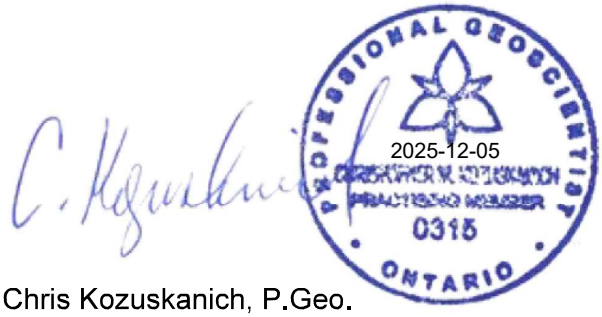
GEMTEC Consulting Engineers and Scientists Limited

Matthew Kelly, P.Eng.
Senior Geotechnical Engineer



Graeme Skinner, Ph.D., P.Eng.
Reviewer, Senior Geotechnical Engineer

Andy Weatherson, M.Env.Sc., P.Geo.
Hydrogeologist



Chris Kozuskanich, P.Geo.
Reviewer, Senior Hydrogeologist

APPENDIX A

Conditions and Limitations of This Report

Conditions and Limitations of This Report

1. **Standard of Care:** GEMTEC has prepared this report in a manner consistent with generally accepted engineering or environmental consulting practice in the jurisdiction in which the services are provided at the time of the report. No other warranty, expressed or implied is made.
2. **Copyright:** The contents of this report are subject to copyright owned by GEMTEC, save to the extent that copyright has been legally assigned by us to another party or is used by GEMTEC under license. To the extent that GEMTEC owns the copyright in this report, it may not be copied without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to the Client in confidence and must not be disclosed or copied to third parties without the prior written agreement of GEMTEC. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests.
3. **Complete Report:** This report is of a summary nature and is not intended to stand alone without reference to the instructions given to GEMTEC by the Client, communications between GEMTEC and the Client and to any other reports prepared by GEMTEC for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. GEMTEC can not be responsible for use of portions of the report without reference to the entire report.
4. **Basis of Report:** This Report has been prepared for the specific site, development, design objectives and purposes that were described to GEMTEC by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this report expressly addresses the proposed development, design objectives and purposes. Any change of site conditions, purpose or development plans may alter the validity of the report and GEMTEC cannot be responsible for use of this report, or portions thereof, unless GEMTEC is requested to review any changes and, if necessary, revise the report.
5. **Time Dependence:** If the proposed project is not undertaken by the Client within 18 months following the issuance of this report, or within the timeframe understood by GEMTEC to be contemplated by the Client, the guidance and recommendations within the report should not be considered valid unless reviewed and amended or validated by GEMTEC in writing.
6. **Use of This Report:** The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without GEMTEC's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, GEMTEC may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process.

   Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.
7. **No Legal Representations:** GEMTEC makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

8. **Decrease in property value:** GEMTEC shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.
9. **Reliance on Provided Information:** The evaluation and conclusions contained in this report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations. information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of misstatements, omissions, misrepresentations. or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
10. **Investigation Limitations:** Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions but even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions.

    The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. Accordingly, GEMTEC does not warrant or guarantee the exactness of of the subsurface descriptions.

    Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination-or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

    In addition, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.
11. **Sample Disposal:** GEMTEC will dispose of all uncontaminated soil and/or rock samples 60 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.
12. **Follow-Up and Construction Services:** All details of the design were not known at the time of submission of GEMTEC's report. GEMTEC should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of GEMTEC's report.

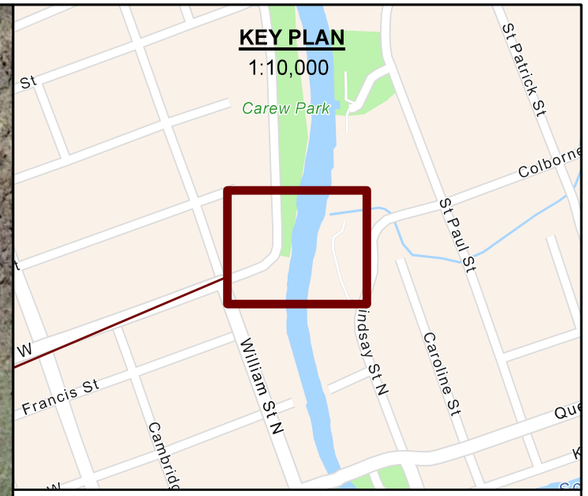
    During construction, GEMTEC should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not

materially differ from those interpreted conditions considered in the preparation of GEMTEC's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in GEMTEC's report. Adequate field review, observation and testing during construction are necessary for GEMTEC to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, GEMTEC's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

13. **Changed Conditions:** Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that GEMTEC be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that GEMTEC be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.
14. **Drainage:** Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. GEMTEC takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

APPENDIX B

Borehole Location Plan



Legend

BH # ——— BOREHOLE ID

APPROXIMATE BOREHOLE LOCATION

NOTES:

1. All locations approximate
2. Coordinate system: NAD83/ UTM zone 17N.
3. Geographic dataset source: Ontario GeoHub.
4. Contains information licensed under the Open Government Licence – Ontario.
5. Service Layer Credits: World Imagery: Maxar, Microsoft
World Navigation Map: Esri Community Maps Contributors, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada

Scale:
1:750
0 10 20 40 60 Meters

Drawing
BOREHOLE LOCATION PLAN

Client:
CIMA+ CANADA INC.

Project
GEOTECHNICAL INVESTIGATIONS FOR
DETAILS DESIGN OF THE COLBORNE STREET BRIDGE
COLBORNE , ONTARIO

Drwn By: S.J.	Chkd By: M.K.
Project No. 101240.007	Revision No. 0
Date SEPTEMBER 2023	**FIGURE 1**

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APPENDIX C

Record of Borehole Sheets

Abbreviations and Terminology Used on Records of Boreholes and Test Pits

Record of Borehole Sheets BH23-F1 to BH23-F4 and BH23-P1 to BH23-P2

ABBREVIATIONS AND TERMINOLOGY USED ON RECORDS OF BOREHOLES AND TEST PITS

SAMPLE TYPES	
AS	Auger sample
CA	Casing sample
CS	Chunk sample
BS	Borros piston sample
GS	Grab sample
MS	Manual sample
RC	Rock core
SS	Split spoon sampler
ST	Slotted tube
TO	Thin-walled open shelby tube
TP	Thin-walled piston shelby tube
WS	Wash sample

SOIL TESTS	
w	Water content
PL, w_p	Plastic limit
LL, w_L	Liquid limit
C	Consolidation (oedometer) test
D_R	Relative density
DS	Direct shear test
G_S	Specific gravity
M	Sieve analysis for particle size
MH	Combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	Organic content test
UC	Unconfined compression test
γ	Unit weight

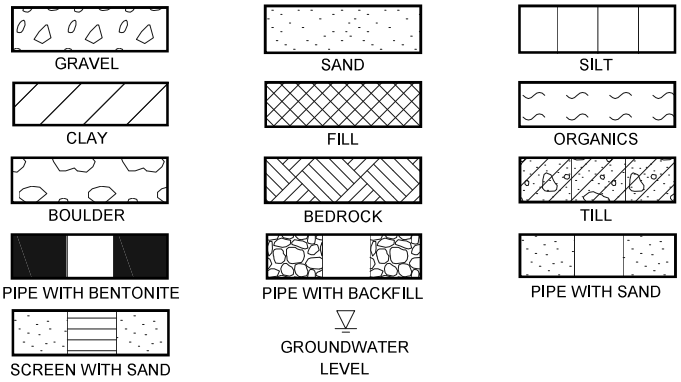
PENETRATION RESISTANCE

Standard Penetration Resistance, N
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 millimetres (30 in.) required to drive a 50 mm split spoon sampler for a distance of 300 mm (12 in.). For split spoon samples where less than 300 mm of penetration was achieved, the number of blows is reported over the sampler penetration in mm.

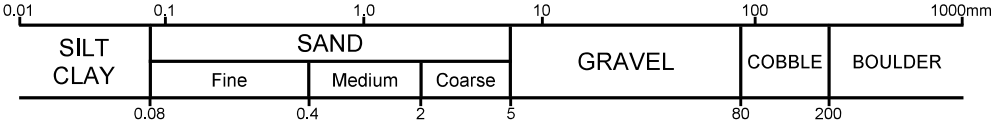
Dynamic Penetration Resistance
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive a 50 mm (2 in.) diameter 60° cone attached to 'A' size drill rods for a distance of 300 mm (12 in.).

WH	Sampler advanced by static weight of hammer and drill rods
WR	Sampler advanced by static weight of drill rods
PH	Sampler advanced by hydraulic pressure from drill rig
PM	Sampler advanced by manual pressure

COHESIONLESS SOIL Compactness		COHESIVE SOIL Consistency	
SPT N-Values	Description	Cu, kPa	Description
0-4	Very Loose	0-12	Very Soft
4-10	Loose	12-25	Soft
10-30	Compact	25-50	Firm
30-50	Dense	50-100	Stiff
>50	Very Dense	100-200	Very Stiff
		>200	Hard



GRAIN SIZE



DESCRIPTIVE TERMINOLOGY

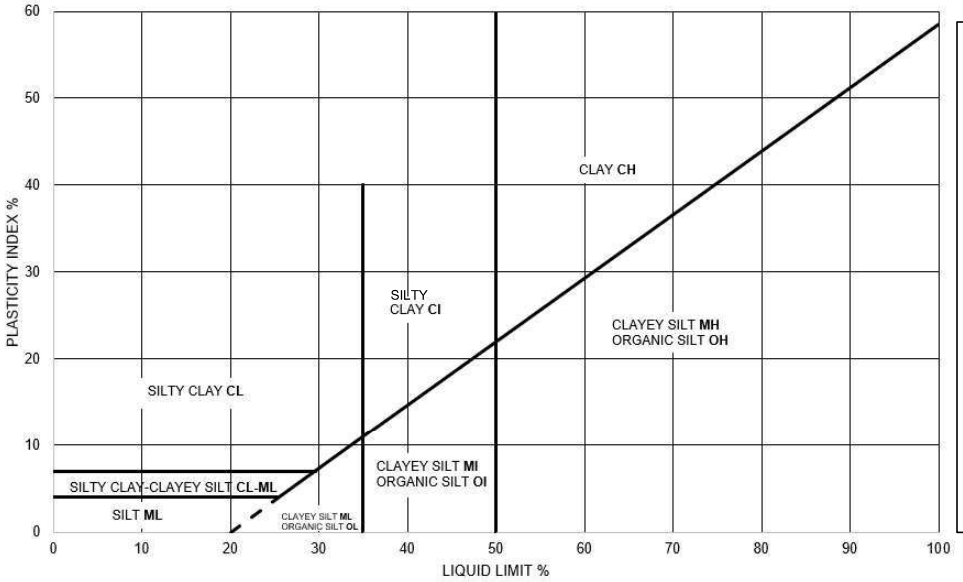
(Based on the CANFEM 4th Edition)

Method of Soil Classification

GEMTEC's Soil Classification is based on the MTC Soil Classification Manual (January 1980)

Organic or Inorganic	Soil Group	Type of Soil		Gradation or Plasticity	$Cu = \frac{D_{60}}{D_{10}}$	$Cc = \frac{(D_{30})^2}{D_{10} X D_{60}}$	USCS Group Symbol	Group Name
Inorganic (Organic Content less than 30%)	Coarse Grained Soils (>50% is larger than 0.075 mm)	Gravel (>50% of coarse fraction is > 4.75 mm)	Gravel with ≤12% fines	Poorly Graded	<4	≤1 or ≥3	GP	Gravel
				Well Graded	≥4	1 to 3	GW	Gravel
			Gravel with >12% fines	Below A Line	N/A		GM	Silty Gravel
				Above A Line	N/A		GC	Clayey Gravel
		Sand (≥50% coarse fraction is > 4.75 mm)	Sand with ≤12% fines	Poorly Graded	<6	≤1 or ≥3	SP	Sand
				Well Graded	≥6	1 to 3	SW	Sand
			Sand with >12% fines	Below A Line	N/A		SM	Silty Sand
				Above A Line	N/A		SC	Clayey Sand

Soil Group	Type of Soil	Liquid Limit	Field Tests			USCS Group Symbol	Group Name
			Dilatancy	Thread Diameter	Toughness		
Fine Grained Soils (≥50% is smaller than 0.075 mm)	Silts (Non-Plastic or PI and LL plot below A-Line)	<50	Rapid	>6 mm	N/A	ML	Silt
			Slow	3 to 6 mm	None to low	ML	Clayey Silt
			Slow to V. Slow	3 to 6 mm	Low	OL	Organic Silt
		≥50	Slow to V. Slow	3 to 6 mm	Low to Medium	MH	Clayey Silt
			None	1 to 3 mm	Medium to High	OH	Organic Silt
	Clays (PI and LL plot above A-Line)	Liquid Limit <35	None	~3 mm	Low to Medium	CL	Silty Clay
		Liquid Limit 35 to 50	None	1 to 3 mm	Medium	CI	Silty Clay
		Liquid Limit >50	None	<1 mm	High	CH	Clay
Highly Organic (> 30%)	Peat (Amorphous or Fibrous)					PT	Peat



Dual Symbol – Is used to indicate when soils are transitional. For coarse grained soils, it is used when the soil has between 5 and 12% fines (e.g., SP-SC, Sand to Silty Sand). For fine-grained soils it is used when the plasticity index and liquid limit values plot in the area shown in the plasticity chart on this page.

Borderline Symbol – Is used to indicate soils that are not clearly in one soil type but have similar behaviour and properties as similar materials (e.g., CL/CI or GM/SM).

RECORD OF BOREHOLE BH23-F1

CLIENT: CIMA+ Canada Inc.
PROJECT: Detail Design of the Colborne Street Bridge
JOB#: 101240.007
LOCATION: See Borehole Location Plan

SHEET: 1 OF 1
DATUM: Local
BORING DATE: Jun 8 2023

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA / WATER CONTENT, %	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger Solid Stem Auger (114mm OD)	Ground Surface		250.65							
		FILL - GRAVEL		0.05							
		FILL - (GM) silty SAND and GRAVEL; brown; dry to moist, loose to compact			1	SS	381	16			
1					2	SS	356	16		MH	
2					3	SS	305	10			
				248.34							
		(SP-SM) SILTY SAND to SAND, some silt, trace gravel; brown to grey; moist, loose to compact		2.31	4	SS	305	10			
3					5	SS	381	19			
				246.99							
		Highly to slightly weathered, thinly bedded, fine grained, weak to medium strong LIMESTONE with shale seams/ layers		3.66	R1	RC	1069	TCR = 100%, SCR =74%, RQD = 30%		UCS = 66.1 MPa	
4											
5					R2	RC	1321	TCR = 100%, SCR =100%, RQD = 72%		UCS = 43.9 MPa	
				244.60							
6		End of Borehole		6.05							
		Notes:									
		1. Borehole backfilled with bentonite upon completion of drilling.									
7											
8											
9											

GEMTEC
Consulting Engineers and Scientists

LOGGED: RN
CHECKED: JH

GEO - BOREHOLE LOG 101240.007_COLBORNESTBRIDGE_GINT_R0_2023_07_06.GPJ GEMTEC 2018.GDT 10/23/23

RECORD OF BOREHOLE BH23-F2

CLIENT: CIMA+ Canada Inc.
PROJECT: Detail Design of the Colborne Street Bridge
JOB#: 101240.007
LOCATION: See Borehole Location Plan

SHEET: 1 OF 1
DATUM: Local
BORING DATE: Jun 8 2023

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	ADDITIONAL LAB. TESTING
		Ground Surface		249.32					
0	Power Auger / Solid Stem Auger (114mm OD)	TOPSOIL		249.16					
		FILL - (SP-SM) SILTY SAND to SAND, some silt, trace gravel to gravelly; brown; moist, compact to dense		0.15	1	SS	330	26	
1					2	SS	381	16	MH
		- becoming wet below about 1.5 m depth			3	SS	381	21	
2					4	SS	406	31	
3				246.14	5	SS	102	50 /0.13	MH
		FILL - No recovery, possible cobbles and/or boulders		3.18	R1	RC	0	TCR = 0%, SCR = 0%, RQD = 0%	
4				245.05					
		CONCRETE (CORED)		4.27					
				244.67					
		Highly to moderately weathered, thinly bedded, fine grained, weak to medium strong LIMESTONE with shale seams/ layers		4.65	R2	RC	1372	TCR = 62%, SCR = 41%, RQD = 0%	
5									
6					R3	RC	762	TCR = 100%, SCR = 90%, RQD = 0%	UCS = 9.3 MPa
				242.92					
		End of Borehole		6.40					
7									
8									
9									

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, %: W_P — W — W_L
10 20 30 40 50 60 70 80 90

Notes:

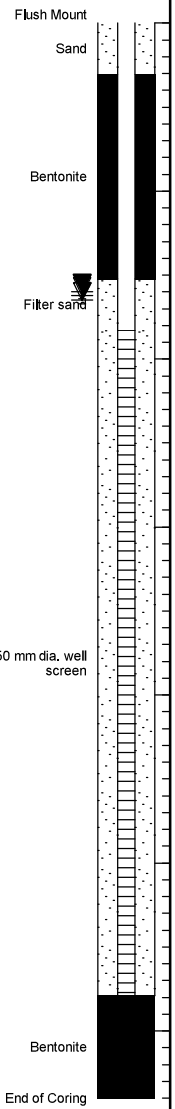
1. Monitoring well installed as shown upon completion of drilling.

2. Groundwater level was measured in monitoring well at approximately 1.6 m below ground surface on August 28, 2023.

3. Groundwater level was measured in monitoring well at approximately 1.6 m below ground surface on September 5, 2023.

4. Groundwater level was measured in monitoring well at approximately 1.7 m below ground surface on September 13, 2023.

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
23/08/28	1.6	247.7
23/09/05	1.6	247.7
23/09/11	1.7	247.7

GEMTEC
Consulting Engineers and Scientists

LOGGED: RN
CHECKED: JH

RECORD OF BOREHOLE BH23-F3

CLIENT: CIMA+ Canada Inc.
PROJECT: Detail Design of the Colborne Street Bridge
JOB#: 101240.007
LOCATION: See Borehole Location Plan

SHEET: 1 OF 1
DATUM: Local
BORING DATE: Jun 8 2023

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA / WATER CONTENT, %	ADDITIONAL LAB. TESTING
0	Power Auger Solid Stem Auger (114mm OD)	Ground Surface		247.59						
		TOPSOIL		247.49						
		(SP-SM) SILTY SAND to SAND, some silt, trace gravel; brown to dark brown, organics; dry to moist		0.10	1	SS	305	5		
				246.98						
		(PT) PEAT; black; wet, very loose to compact		0.61						
1					2	SS	203	12		
2					3	AS	0	2	>>	
				245.45						
		(SP-SM) SILTY SAND to SAND, some silt, trace gravel; brown to dark brown; organics; moist to wet		2.13						
				245.23	4	SS	76	50 /0.08		
		Highly weathered, thinly bedded, fine grained, weak to medium strong LIMESTONE with shale seams/ layers		2.36	R1	RC	991	TCR = 100%, SCR = 72%, RQD = 28%		UCS = 33.5 MPa
3										
4					R2	RC	1016	TCR = 100%, SCR = 95%, RQD = 72%		UCS = 23.8 MPa
				243.02						
		End of Borehole		4.57						
5										
6										
7										
8										
9										

Notes:

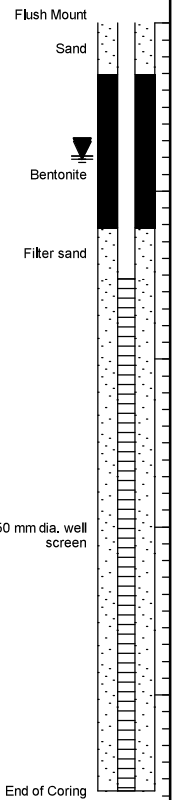
1. Monitoring well installed as shown upon completion of drilling.

2. Groundwater level was measured in monitoring well at approximately 0.8 m below ground surface on August 28, 2023.

3. Groundwater level was measured in monitoring well at approximately 0.8 m below ground surface on September 5, 2023.

4. Groundwater level was measured in monitoring well at approximately 0.8 m below ground surface on September 13, 2023.

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
23/08/28	0.8	246.8
23/09/05	0.8	246.8
23/09/11	0.8	246.8

GEMTEC
Consulting Engineers and Scientists

LOGGED: RN
CHECKED: JH

RECORD OF BOREHOLE BH23-F4

CLIENT: CIMA+ Canada Inc.
PROJECT: Detail Design of the Colborne Street Bridge
JOB#: 101240.007
LOCATION: See Borehole Location Plan

SHEET: 1 OF 1
DATUM: Local
BORING DATE: Jun 8 2023

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA / WATER CONTENT, %	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger Solid Stem Auger (114mm OD)	Ground Surface		249.19							
		TOPSOIL		0.08							
		(SP) SAND, some silt, trace gravel		0.18							
		(OL) ORGANIC SILT; black		248.86 0.33	1	SS	381	17			
1		(GM) silty SAND and GRAVEL; brown to grey; moist to wet; very loose to compact			2	SS	203	15		MH	
2					3	SS	102	3			
				246.78	4	SS	76	50 /0.127			
		Highly to moderately weathered, thinly bedded, fine grained, weak to medium strong LIMESTONE with shale seams/ layers		2.41	R1	RC	635	TCR = 44%, SCR = 10%, RQD = 0%			
3											
					R2	RC	1372	TCR = 100%, SCR = 91%, RQD = 50%			
4				244.77							
		End of Borehole		4.42							
5		Notes:									
		1. Borehole backfilled with bentonite upon completion of drilling.									
6											
7											
8											
9											

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, %: W_P — W — W_L
10 20 30 40 50 60 70 80 90

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LOGGED: RN
CHECKED: JH

GEO - BOREHOLE LOG 101240.007_COLBORNESTBRIDGE_GINT_R0_2023_07_06.GPJ GEMTEC 2018.GDT 10/23/23

RECORD OF BOREHOLE BH23-P1

CLIENT: CIMA+ Canada Inc.
PROJECT: Detail Design of the Colborne Street Bridge
JOB#: 101240.007
LOCATION: See Borehole Location Plan

SHEET: 1 OF 1
DATUM: Local
BORING DATE: Jun 8 2023

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		256.20						
0	Power Auger Solid Stem Auger (114mm OD)	ASPHALT		0.07						
		(SP-SM) SILTY SAND to SAND, some silt, trace to some gravel; brown; compact (FILL)		255.52	1	SS	356	22	MH	
1		(SP-SM) SILTY SAND to SAND, some silt, trace gravel to gravelly; light brown to grey; moist to wet, loose to very dense		0.69	2	SS	76	6		
2					3	SS	305	20		
					4	SS	432	60		
3					5	SS	330	81		
				252.54						
		End of Borehole		3.66						
4		Notes:								
		1. Borehole backfilled with bentonite upon completion of drilling.								
5										
6										
7										
8										
9										

SAMPLES

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, %: W_P — W — W_L
10 20 30 40 50 60 70 80 90

GEMTEC
Consulting Engineers and Scientists

LOGGED: RN
CHECKED: JH

GEO - BOREHOLE LOG 101240.007_COLBORNESTBRIDGE_GINT_R0_2023_07_06.GPJ GEMTEC 2018.GDT 10/23/23

RECORD OF BOREHOLE BH23-P2

CLIENT: CIMA+ Canada Inc.
PROJECT: Detail Design of the Colborne Street Bridge
JOB#: 101240.007
LOCATION: See Borehole Location Plan

SHEET: 1 OF 1
DATUM: Local
BORING DATE: Jun 8 2023

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger Solid Stem Auger (114mm OD)	Ground Surface		250.03						
		ASHPALT		0.05						
		(GM) silty SAND and GRAVEL; light brown to brown; dry to moist, compact to very dense (FILL)			1	SS	305	63		
1					2	SS	330	31	MH	
2					3	SS	356	28		
				247.71						
		(SP-SM) SILTY SAND to SAND, some silt, some gravel to gravelly; brown to grey; moist, compact		2.31	4	SS	178	10		
3					5	SS	406	18		
				246.37						
		End of Borehole		3.66						
4		Notes: 1. Borehole backfilled with bentonite upon completion of drilling.								
5										
6										
7										
8										
9										

SOIL PROFILE / SAMPLES

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, %: W_P — W — W_L
10 20 30 40 50 60 70 80 90

GEMTEC
Consulting Engineers and Scientists

LOGGED: RN
CHECKED: JH

GEO - BOREHOLE LOG 101240.007_COLBORNESTBRIDGE_GINT_R0_2023_07_06.GPJ GEMTEC 2018.GDT 10/23/23

APPENDIX D

Monitoring Well Installation Details

Table D-1 : Monitoring Well Construction Information - Colborne Street Bridge, Kawartha Lakes, Ontario

Borehole Location	UTM Coordinates		Installation Date	Ground Surface Elevation*	Top of Casing Elevation	Measured Stick-up	Top of Screen	Bottom of Screen	Top of Screen	Bottom of Screen	Screened Lithology
	Easting	Northing		(m amsl)	(m amsl)	(m)	(m bgs)	(m bgs)	(m amsl)	(m amsl)	
BH23-F2	680236	4914478	2023-08-06	249.32	249.26	-0.06	1.83	5.79	247.49	243.47	(SM) Silty Sand; Concrete; Limestone Bedrock
BH23-F3	680284	4914490	2023-08-06	247.59	247.54	-0.05	1.52	4.57	246.07	242.97	(PT) Peat; (SM) Silty Sand; Limestone Bedrock

Notes:

m - metre
m amsl - metres above mean sea level
m bgs - metres below ground surface
UTM - Universal Transverse Mercator, Zone 17T
* - Estimated based on DEM interpolation from data provided by CIMA+

Table D-2 Groundwater Depths and Elevations - Colborne Street Bridge, Kawartha Lakes, Ontario

Borehole Location	Ground Surface Elevation*	Top of Casing Elevation	Top of Screen	Bottom of Screen	Screened Lithology	August 28, 2023		September 5, 2023		September 11, 2023	
						WL Below Ground	Approximate WL Elev.	WL Below Ground	Approximate WL Elev.	WL Below Ground	Approximate WL Elev.
	(m amsl)	(m amsl)	(m amsl)	(m amsl)		(m bgs)	(m amsl)	(m bgs)	(m amsl)	(m bgs)	(m amsl)
BH23-F2	249.32	249.26	247.49	243.47	(SM) Silty Sand; Concrete; Limestone Bedrock	1.62	247.70	1.60	247.72	1.65	247.68
BH23-F3	247.59	247.54	246.07	242.97	(PT) Peat; (SM) Silty Sand; Limestone Bedrock	0.79	246.80	0.79	246.80	0.81	246.79

Notes:

Elev. - Elevation
m - metre
m amsl - metres above mean sea level
m bgs - metres below ground surface
WL - Water Level
* - Estimated based on DEM interpolation from data provided by CIMA+

Table D-3 Summary of Hydraulic Conductivity Values - Single Well Response Tests - Colborne Street Bridge, Kawartha Lakes, Ontario

Well Name	Date of Test	Ground Surface Elevation*	Top of Screen	Bottom of Screen	Top of Screen	Bottom of Screen	Screened Lithology	Type of Test	Hydraulic Conductivity Estimate
		(m amsl)	(m bgs)	(m bgs)	(m amsl)	(m amsl)			(m/s)
BH23-F2	2023-08-28	249.32	1.83	5.79	247.49	243.47	(SM) Silty Sand; Concrete; Limestone Bedrock	Rising	7.E-06
BH23-F3	2023-09-11	247.59	1.52	4.57	246.07	242.97	(PT) Peat; (SM) Silty Sand; Limestone Bedrock	Rising	1.E-03

Notes:

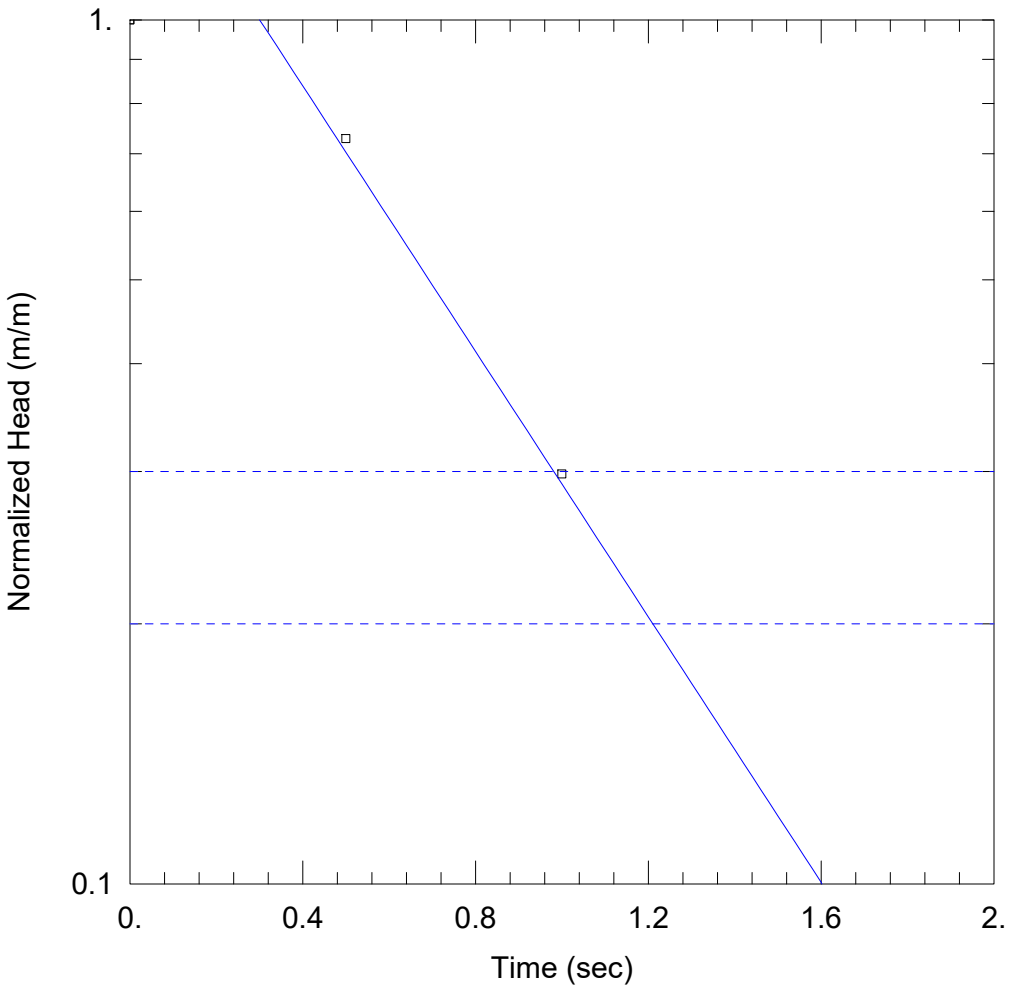
All tests were analysed using the Bouwer and Rice (1976) method

- - Not Tested
m amsl - metres above mean sea level
m bgs - metres below ground surface
m/s - metres per second
* - Estimated based on DEM interpolation from data provided by CIMA+

Bouwer, H. and R.C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

APPENDIX E

Hydrogeological Testing Results



BH23-F2 RISING HEAD TEST

Data Set: N:\Projects\101200\101240.007\Technical Work\HydroG\Analysis\K-Tests\BH23-F2.aqt
Date: 09/20/23 Time: 11:06:49

PROJECT INFORMATION

Company: GEMTEC
Client: CIMA+
Project: 101240.007
Location: Kawartha Lakes, ON
Test Well: BH23-F2
Test Date: September 11, 2023

AQUIFER DATA

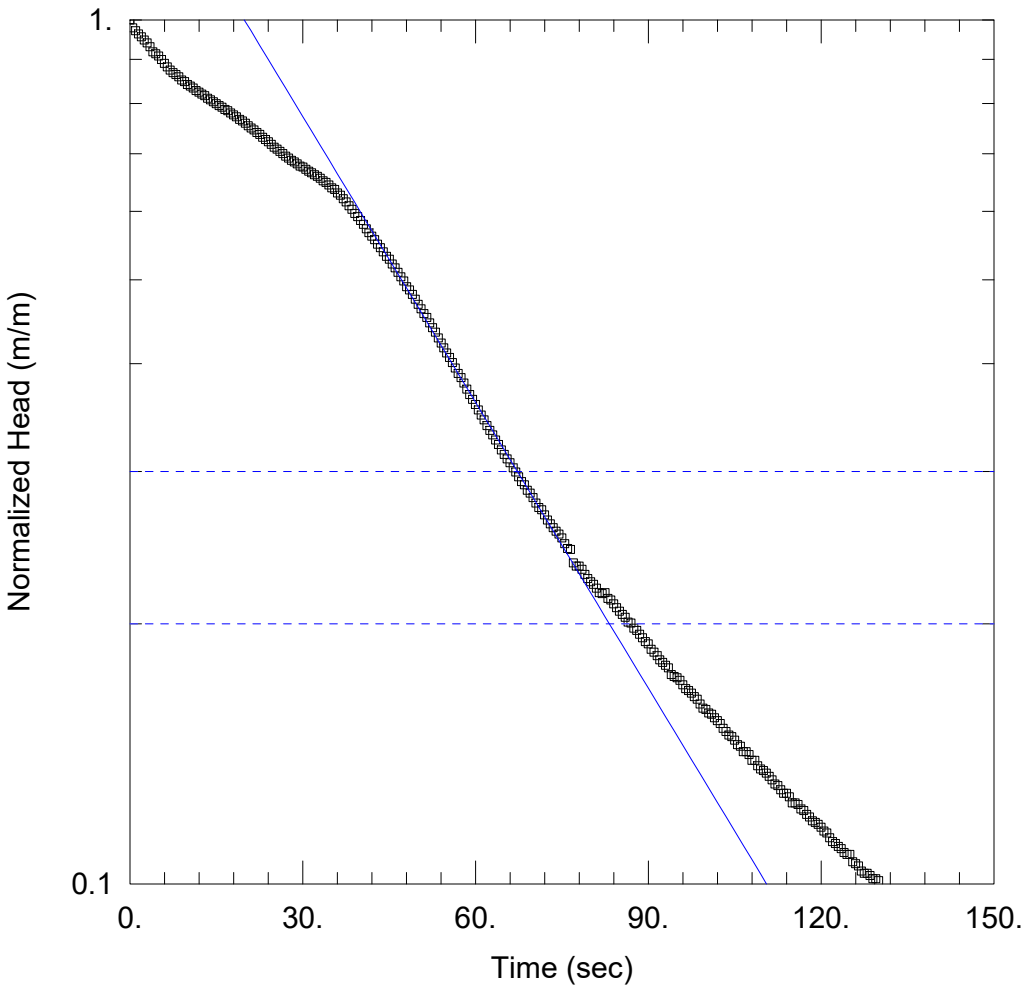
Saturated Thickness: 4.155 m
Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (BH23-F2)

Initial Displacement: 0.06233 m
Total Well Penetration Depth: 4.155 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.155 m
Screen Length: 4.155 m
Well Radius: 0.057 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001 m/sec
y0 = 0.1061 m



BH23-F3 RISING HEAD TEST

Data Set: N:\Projects\101200\101240.007\Technical Work\HydroG\Analysis\K-Tests\BH23-F3.aqt
Date: 10/10/23 Time: 13:49:02

PROJECT INFORMATION

Company: GEMTEC
Client: CIMA+
Project: 101240.007
Location: Kawartha Lakes, ON
Test Well: BH23-F3
Test Date: August 28, 2023

AQUIFER DATA

Saturated Thickness: 3.78 m
Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (BH23-F3)

Initial Displacement: 1.999 m
Total Well Penetration Depth: 3.78 m
Casing Radius: 0.0254 m
Static Water Column Height: 3.78 m
Screen Length: 3.35 m
Well Radius: 0.057 m

SOLUTION

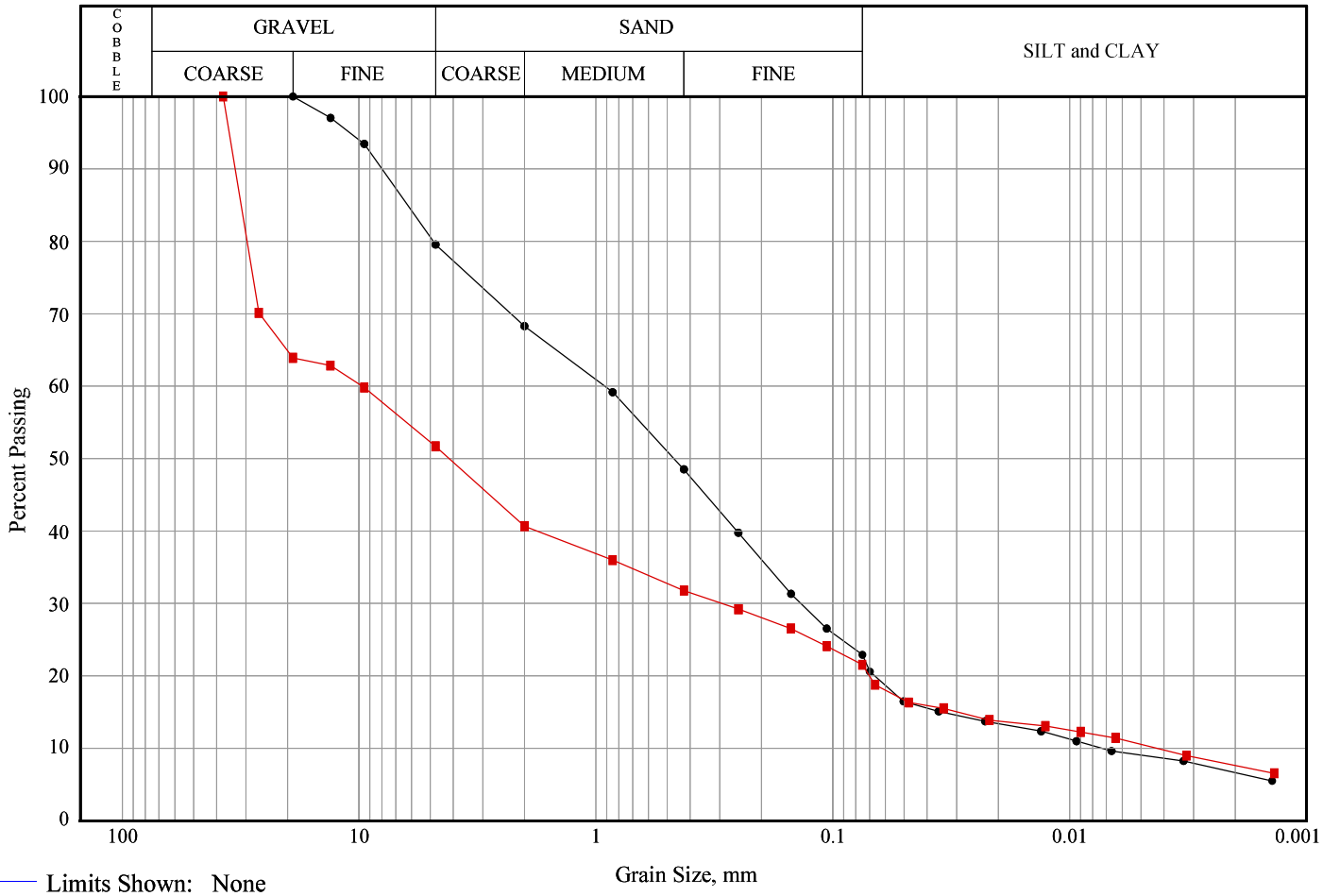
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 8.5E-6 m/sec
y0 = 3.311 m

APPENDIX F

Geotechnical Laboratory Testing Results

GEMTEC Consulting Engineers and Scientists	Client: CIMA Canada Inc.	Soils Grading Chart (T88)
	Project: Geotechnical Investigations of the Colborne Street Bridge	
	Project #: 101240007	

Note: More information available upon request



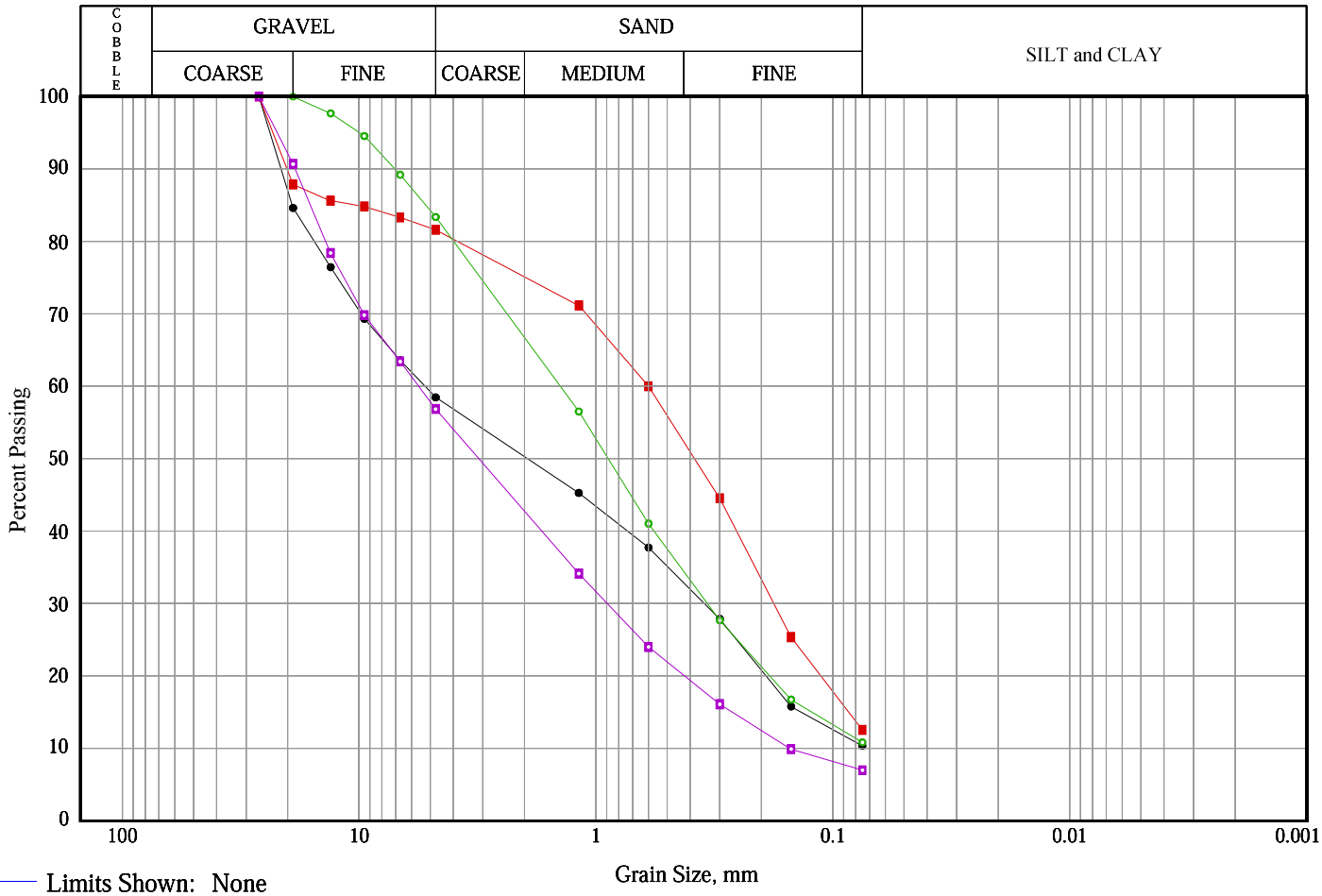
Limits Shown: None

Line Symbol	Sample	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt and Clay
●	FILL	BH23-F2	SA-5	3.1-3.2	20.5	56.6	22.9
■	FILL	BH23-F4	SA-2	0.8-1.4	48.3	30.2	21.6

Line Symbol	CanFEM Classification	USCS Symbol	D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	% 5-75µm
●	Gravelly sand, some silt, trace clay	N/A	0.01	0.03	0.14	0.47	0.92	6.23	13.9
■	Sandy gravel, some silt, some clay	N/A	0.00	0.03	0.29	4.16	9.72	31.50	11.0

GEMTEC Consulting Engineers and Scientists	Client: CIMA Canada Inc.	Soils Grading Chart
	Project: Geotechnical Investigations of the Colborne Street Bridge	
	Project #: 101240007	

Note: More information available upon request



Line Symbol	Sample	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay
●	FILL	BH23-F1	SA-2	0.8-1.4	41.5	48.1	10.3	
■	FILL	BH23-F2	SA-2	0.8-1.4	18.4	69.1	12.5	
○	FILL	BH23-P1	SA-1	0-0.6	16.6	72.6	10.8	
□	FILL	BH23-P2	SA-2	0.8-1.4	43.1	49.9	7.0	

Line Symbol	CanFEM Classification	USCS Symbol	D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	% 5-75µm
●	Sand and gravel, some silt	N/A	---	0.14	0.35	1.95	5.27	19.15	---
■	Sand, some gravel, some silt	N/A	---	0.09	0.18	0.38	60.00	10.28	---
○	Sand, some gravel, some silt	N/A	---	0.12	0.34	0.89	1.41	5.22	---
□	Sand and gravel, trace silt	N/A	0.15	0.27	0.90	3.12	5.60	16.06	---

GEMTEC
Consulting Engineers and Scientists

Client: CIMA Canada Inc.

Project: Geotechnical Investigations for Details Design of the Colborne Street Bridge

Project #: 101240007

Rock Core Compressive Strength

Date/Time Sampled: 23/07/19 9:41:00 AM	Date/Time Tested: 23/07/19 9:43:15 AM

BH	Sample No	Depth	Description	Diameter, mm	Area, mm^2	Length After Capping, mm	L/D	Load, kN	Comp. Str., MPa
BH23-F2	B	6.1-6.2		62.5	3068	79	1.27	30.470	9.3
BH23-F1	C	4.6-4.7		62.5	3068	122	1.95	217.150	66.1
BH23-F1	D	5.0-5.8		62.5	3068	117	1.88	144.200	43.9
BH23-F3	E	3.2-3.4		62.5	3068	123	1.97	110.270	33.5
BH23-F3	F	4.1-4.3		62.5	3068	75	1.20	78.200	23.8

APPENDIX G

Photographs of Rock Core Samples

PHOTOGRAPHS OF ROCK CORE SAMPLES

FIGURE 1

GEMTEC

Drawn By: MWK **Reviewed By:** GDS

Project No.: 101240.007

PHOTOGRAPHS OF ROCK CORE SAMPLES

FIGURE 2

GEMTEC

Drawn By: MWK **Reviewed By:** GDS

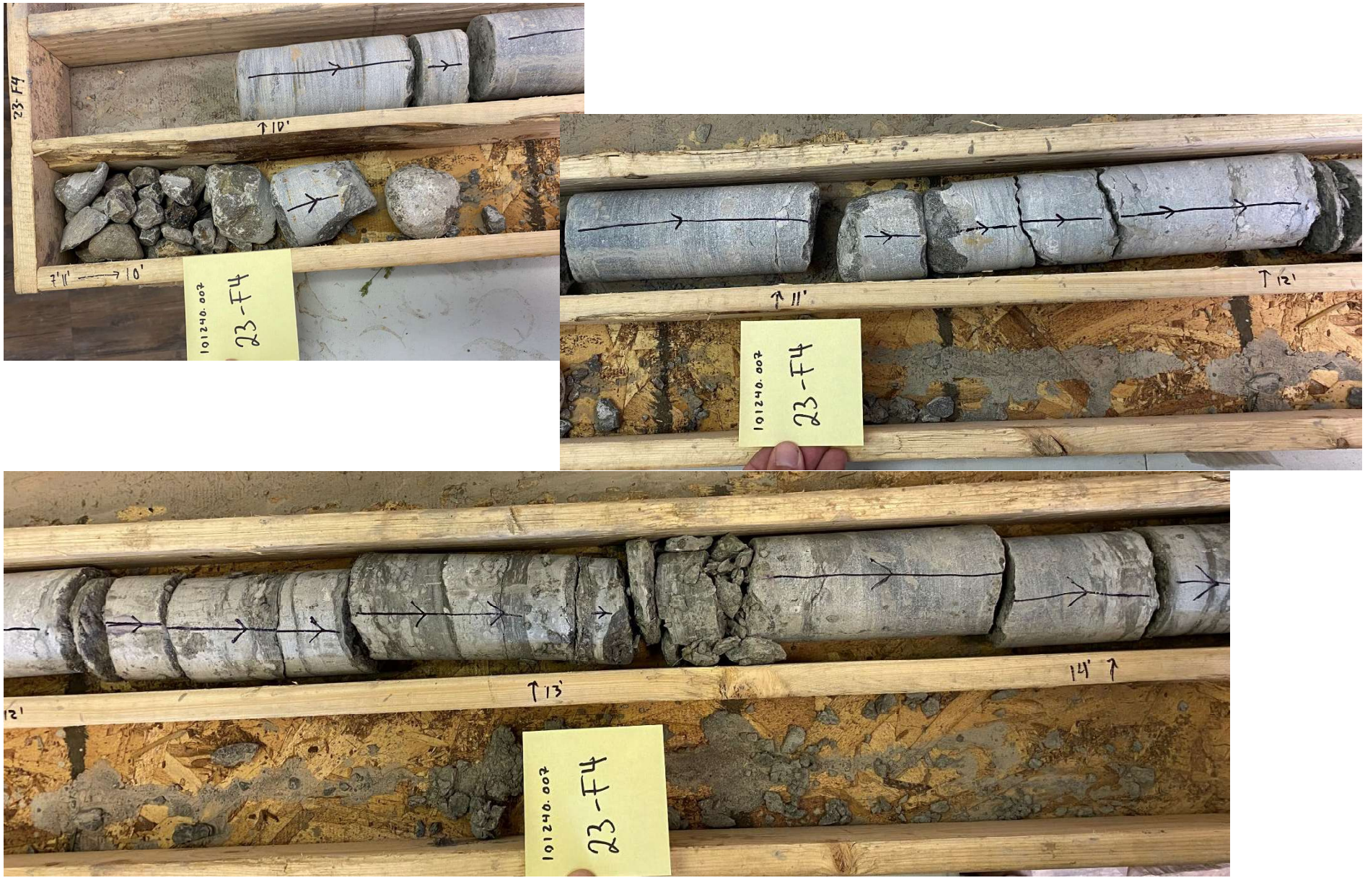
Project No.: 101240.007

PHOTOGRAPHS OF ROCK CORE SAMPLES

FIGURE 3

PHOTOGRAPHS OF ROCK CORE SAMPLES

FIGURE 4

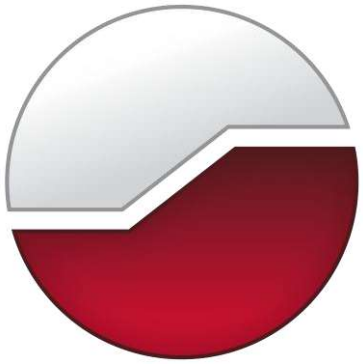


GEMTEC

Drawn By: MWK **Reviewed By:** GDS

Project No.: 101240.007

experience • knowledge • integrity



civil	civil
geotechnical	géotechnique
environmental	environnement
structural	structures
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

expérience • connaissance • intégrité