

City of Kawartha Lakes Engineering Drafting Standards

1. Design revisions after approval (Red Line Revision)

To make any changes to the design drawings after they have been approved, submit two prints of each of the original drawings affected with the proposed changes shown as a strikethrough of the design with a leader and box surrounding the changes in red. A letter outlining the reasons for the required changes must also be submitted. The Engineering Department will inform the Developer/Designer if the proposed changes meet with the approval of the Municipality. One copy of the requested change will be signed and returned, accompanied by a letter authorizing the changes to be made on the original approved detailed design drawings. No changes are to be made to any original approved drawings without following this procedure.

a) “Red-Line” DRAWINGS

General

Prior to Acceptance for Maintenance by the City, the Consulting Engineer shall produce a complete set of “Red-Lined” as constructed drawings in accordance with City’s “Red-Lined” drawing requirements.

These drawings shall be sealed and signed by a Registered Professional Engineer and labelled “Red-Lined” and dated.

Upon completion of construction and prior to Acceptance for Maintenance by the City, “Red-Lined” drawings shall be submitted to the Director of Engineering for review. These drawings shall also be submitted in digital format, as described at the end of this Section.

“Red-Lined” storm and sanitary sewer design sheets shall be provided in digital spreadsheet format and also included in the drawing sets.

Information required for the “Red-Lined” engineering drawings include:

- Verification of location and survey of invert elevations of all sewers, manholes, catchbasins and rear yard catchbasins. In the case of manholes on easements, ditch inlet catchbasins and rear yard catchbasins, the rim elevation is also required
- Distance between sewer manholes, including pipe sizes and calculated sewer grades. Sewer lengths shall be shown to the nearest 0.1 m and sewer grades calculated to two decimal places

Where there is a major difference between the design and “Red-Lined” data, the Consulting Engineer is required, in writing, to explain the discrepancy and verify

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that the “Red-Lined” discrepancy does not adversely affect the intent of the services.

b) **Storm Sewers**

All sewer invert elevations, if different from the proposed, shall be indicated on the “Red-Lined” drawings. If the difference is greater than 150 mm, affected portions of sewer (in profile) shall be redrawn. Hydraulic calculations shall be provided, reflecting these changes, for review and acceptance.

Any manhole locations that differ by more than 2.0 m from the proposed location shall be redrawn in both plan and profile.

The following shall be indicated on the “Red-Lined” drawings, if different from the proposed:

- Type of manhole
- Pipe size
- Grade of sewer
- Type of pipe material
- Class of pipe
- Type of bedding

c) **Stormwater Management Facilities**

All SWM facility invert elevations and storage volumes, if different from the proposed, shall be indicated on the “Red-Lined” drawings.

The design versus ‘as-constructed’ storage volumes and discharge rates shall be shown on “Red-Lined” drawings.

“Red-Lined” SWM drawings shall confirm that the proposed SWM facility design (storage and discharge) is not compromised, otherwise the SWM facility shall be retrofitted accordingly prior to Acceptance for Maintenance.

The SWM facility ‘Red-Lined’ drawings shall be used as the baseline to indicate accumulated sediment levels, later at the time of Assumption.

d) **Sanitary Sewers**

All sewer invert elevations, if different from the proposed, shall be indicated on the “As-Constructed” drawings. If the difference is greater than 150 mm, affected portions of sewer (in profile) shall be redrawn.

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Any manhole location that differs by more than 2.0 m from the proposed location shall be redrawn both in plan and profile.

The following shall be indicated on the “Red-Lined” drawings, if different from the proposed:

- Type of manhole
- Pipe size
- Grade of pipe
- Tee chainage from downstream manhole
- Type of pipe material
- Class of pipe
- Type of pipe bedding
- Original ground at centre profile to remain on all plans

e) **Watermains**

All watermain elevations, if different from the proposed shall be indicated on the “Red-Lined” drawings. If the difference is greater than 150 mm, the affected portions of watermain (in profile) shall be redrawn.

All alignment changes greater than 150 mm to have offsets revised in plan. If the alignment changes exceed 0.5 m, watermain shall be redrawn in plan as well as indicate revised offsets.

All watermain valves shall be tied to permanent features such as buildings, manholes, catchbasins, etc.

“Red-Lined” information to include ties and elevations to all stubs.

The following shall be indicated on the “Red-Lined” drawings, if different from the proposed:

- Pipe size
- Type and class of pipe
- Type of bedding
- All fitting changes (bends, reducers, blocking, restrained joints, etc.)
- Type of valves and hydrants
- Original ground profile over watermain (if applicable) to remain
- Remove all references to proposed works or planned construction activities
- Add actual street name, etc.

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2. Record Submissions (As-Constructed)

The Developer/Designer shall submit through the Engineering Department “As-Constructed” Record Drawings signed and sealed by the engineer of record and other related information giving detailed measurements of the actual municipal services constructed. The submission of this data for record purposes is a condition of the issuance of Substantial Completion Certificates/Acceptance by the Municipality. Record Drawings may be required in two stages.

a) General Requirements:

Drawings shall include all information as specified elsewhere for the construction drawings, but shall be corrected upon completion of construction to note all works removed during construction. As an alternative, this information shall be retained in the digital file on layer (X-REMV) but not displayed on the final print. Note abandoned services and reflect as-constructed conditions for permanent records.

All dimensions shown shall reflect the as-constructed conditions of the construction and all references to “Proposed” shall be removed. Record Drawings shall be to scale in accordance with the as-constructed dimensions shown. The Revision Table shall be completed indicating the drawings are Record Drawings.

All as-constructed features shall be surveyed and survey points imported into the digital drawing on the appropriate layers (X-SURV-SPOT). The record drawings shall reflect the true elevation and location of all constructed features, in both the plan and profile views. Record Drawings indicating as-constructed elevations will be to 2 decimals. Survey data and drawings submitted to the City will be in UTM NAD83 Zone 17N.

Excel attribute table to be filled out and included with the digital submission.

The Record drawings shall be submitted as follows:

- Municipal Standard AutoCAD format
- A pdf version.
- A csv file of any survey information
- One full size set on bond paper signed and sealed.
- Excel attribute table

Please submit digital submissions by CD

Line work for all constructed works shown on the drawings shall retain the thicker line density for ease of determining the extent of works covered by the drawings.

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Proposed construction for future phases of the project shall not be shown on the Record Drawings.

All Record Drawings shall also include the following as-constructed information:

- The location and elevation of all existing utilities and services encountered in the construction operation
- The location and invert elevation at property line of all individual service connections, and the tee chainage, at the main for all constructed and existing works,
- A note on each drawing describing the type of trench material (sand, gravel, clay, etc.) encountered during construction and the location and profile of all rock.

All service connections shall be shown with dimensions to property lines. Private services will also be shown on the drawings with labels indicated "private".

See Appendix for Submission Compliance Checklist

b) Completed Stage

Within thirty (30) days of satisfactory completion of surface improvements and as a condition of the issuance of Construction Completion Certificate for surface improvements the Developer/Designer shall submit to the Engineering Department the following information:

- Certification by the Consulting Engineer that all work has been completed in accordance with the plans and specifications, the City's Infrastructure Guidelines and that all work and deficiencies have been completed.
- One set of digital copies (PDF & DWG) of Record Drawings sealed by a professional engineer registered in the Province of Ontario and complete with a "Certificate of Compliance". At this stage, the drawing shall be stamped "Record Drawings".
- All previously unsubmitted certificates concerning materials inspection and testing, mix designs, deflection test, concrete strength tests, compaction tests, infiltration, exfiltration, light, video-inspection tests, as required by this document and by the Municipality.
- Completed tender document as tendered by the successful contractor and a copy of the Form 6 Certificate of Substantial Performance of The Contract, Certificate of Publication and Final Progress Payment Certificate.

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- Record Lot Grading Plan (Subdivision Only). Once the final lot grading certification is received by the Engineering Department, the Developer is to prepare an overall Record Lot Grading and Drainage Plan identifying as-constructed elevations. This is the developer's responsibility prior to assumption of the subdivision.

Upon acceptance of this data, the Developer/Designer may request a construction completion inspection and within thirty (30) days of such request, the Municipality will carry out an inspection for issuance of the Substantial Completion Certificate/Acceptance. Should seasonal conditions not permit the inspection, execution of the Construction Completion Certificate, by the Municipality, will be delayed until appropriate conditions exist and/or conditional acceptance may be granted based on the Consulting Engineer's Certification.

c) **Additional Information**

Record Drawings will be of the same format as the original construction drawings with all changes noted and the following information added:

- Design data is erased on original and replaced with record data.
- All hydrants, valves, curb stops, manholes and catch basins are to be dimensioned in two directions or labelled with a Northing and Easting coordinate.