

City of Kamloops

ENGINEERING DRAWING SUBMISSION REQUIREMENTS

August 2014

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1.0 GENERAL

The purpose of this section is to outline the minimum standards and requirements the City of Kamloops will accept for Design and Record Drawing submissions for engineering work(s).

Drawings shall clearly show the existing and proposed locations of all utilities using offsets from property lines or boundaries of rights-of-way.

Dimensioning and "offset measurements" required by this policy may be minimized on the construction drawings. However detailed field measurements are required on the record drawings, for City records, in accordance with this policy.

Elevations shall be relative to geodetic datum. The horizontal coordinates shall be referenced to the NAD83 UTM coordinate system. A minimum of two reference points with coordinates shall be shown on each design drawing. A minimum of one (1) reference bench mark with elevation shall be shown on each design drawing.

Where no standard is defined in this schedule for the preparation of a drawing to portray a particular service, structure or other item, requirements may be obtained through discussion with the Director or Designate.

All drawings shall be signed and sealed by a Professional Engineer registered in British Columbia.

2.0 DRAWING STANDARDS

2.1 *Sheet Sizes*

Drawings shall be submitted using the following standard sheet sizes (outside dimensions):

A1 841 mm x 594 mm

A2 594 mm x 420 mm

A3 420 mm x 297 mm

Record drawings are to be A1 size unless mutually agreed otherwise.

2.2 *Title Block*

If required, the City will supply an A1 size title block template drawing which contains the surrounding and profile grid for the drawings. The title shall describe the contents of the drawing (e.g. key plan, road, etc.) and shall clearly indicate the location of the works by road name(s).

2.3 Scales

The following scales shall normally be used:

Location Plans - 1:10,000; 1:5,000; 1:2,500

General Layout Plans - 1:500

Details - 1:500; 1:100; 1:20; 1:10

Plan/Profile - Horizontal 1:500 or 1:250

- Vertical 1:50 or 1:25

Cross-Sections - Horizontal 1:100

- Vertical 1:50 or 1:25

2.4 Legend

The legend is contained on the City's A size title block.

2.5 Media Submissions

Drawings shall be submitted upon the following media types:

- Design drawings – paper (5 copies)
- Design drawings – digital PDF

- Record drawings – paper (2 copies)
- Record drawings – digital PDF
- Record drawings – AutoCAD drawing on CD
- Operation & Maintenance Manuals – paper (3 copies)
- Operation & Maintenance Manuals – digital PDF

PDF submissions should not have any permission restrictions enabled within the file.

2.6 Drawing Appearance

An AutoCAD template drawing and supporting files containing layering, symbology, linetype definitions, etc. can be downloaded from the City's website. www.kamloops.ca/engineering/civil3dtemplate.shtml)

AutoCAD drawing units should be meters and features within model space should not be moved and/or rotated from the UTM coordinate system.

2.7 Survey requirements

Detailed survey pick up required for both design drawing creation and record drawing preparation shall be based on the City of Kamloops Standard Survey Requirements.

(www.kamloops.ca/engineering/pdfs/14-StandardSurveyRequirements.pdf)

3.0 REQUIRED DRAWINGS

The following information must be included on all detailed design drawing submissions:

- Show existing property and legal description;
- North Arrow;
- Drawing scale;
- NAD83 UTM Coordinates;
- Existing monument locations;
- Certifications as outlined by the City of Kamloops Design Criteria Manual.

Each set of drawings shall include the following drawings and shall be presented in the same order:

3.1 Cover Sheet

The cover sheet shall show the following information:

- Information as detailed under sections "1.0 General" and "2.0 Drawing Standards";
- The consultant's name and phone number;
- A description of the project;
- The City project number, tender reference number (if applicable);
- Legal description of the lands involved;
- A site location plan;
- Design drawing index.

3.2 General Layout Plan

The General Layout Plan shall show the following information:

- Information as detailed under sections "1.0 General" and "2.0 Drawing Standards";
- Area being served with lot numbers, lot areas, and all Works and Services;
- Beginning and end of proposed construction phases.

3.3 Plan Profile Drawings

The plan profile sheet shall show the following information:

- Plan Profile drawings shall show information as detailed under sections "1.0 General" and "2.0 Drawing Standards";
- The bottom half of a Plan Profile sheet shall show the plan view and the top half the profile view;
- The plan view shall show the legal layout, with legal descriptions of all properties, the location of all sidewalks, curbs, gutters, catch basins, underground utilities such as sanitary sewer, storm sewer, water, manholes, valves, hydrants, streetlights, telephone, television, gas, power, stationing and all survey monuments, etc.;
- Drawings shall also show existing dwellings, fences, trees, hedges, unusual ground features, existing roads and driveways including the type such as asphalt, concrete or gravel;
- The profile view shall show elevations, stationing, surface and utility grades with related data;
- The profile shall be shown at true centerline length and projected above the plan view in as close a relationship as possible;
- The profile view shall show the existing ground centerline and related data prior to construction;
- Elevations are to be placed at the right and left hand side of the profile and repeated when there is a break in the profile;
- Both plan and profile stationing must be tied to a property line or road boundary;
- The following detailed road and utility information shall be included in the plan profile drawings:

Roads

Plan	<ul style="list-style-type: none"> - Road classifications - Horizontal curve information including: <ul style="list-style-type: none"> o Stationing of B.C. and E.C. of all curves o Delta angle o Centerline radius o Tangent length o Centerline arc length - Curb radii on curb returns at intersections and at the end of cul-de- sacs - Centerline of road - Road widths and road allowances - Alignment of roads beyond property line - Sidewalk locations and widths - Type of curb and gutter proposed - Ditching where no curbing is required - Walkway locations
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	<ul style="list-style-type: none"> - Catch basin locations - Proposed signage and pavement markings - Wheelchair ramps - Letdowns for community mail boxes, if necessary - Bicycle Facilities
Profile	<ul style="list-style-type: none"> - Centerline and gutter profiles - On super-elevated curves and cross fall sections show a profile of each gutter with pertinent gutter elevations either on the profile or in tabular form - Vertical curve information including: <ul style="list-style-type: none"> o Stationing and elevation of the B.C., E.C, and P.I. o Stationing and elevation of the low spot of sag curves o Length of the vertical curve o K value of vertical curvature o Algebraic difference in grades - Vertical points of intersection and grades between points - Centre lines of intersecting roads - Alignment of road centerline beyond property line - Existing ground profile - Ditch profiles if necessary - Walkway profile
Details	<ul style="list-style-type: none"> - Road cross section details including lane widths, parking etc. - Walkway Bicycle Facility details - Geometric spot elevations at road intersections and cul-de-sac bulbs

Water Utilities

Plan	<ul style="list-style-type: none"> - All water mains and service connections - Offsets of water mains from property lines - Pipe size, material, class and type (e.g. 150mm PVC CL150 WAT) - All fittings, valves, hydrants, standpipes, curb stops, etc. - Corrosion protection - Easements: existing and/or required
Profile	<ul style="list-style-type: none"> - Profiles of invert of pipes - Size, material, class and type of pipe (e.g. 150 PVC CL150 WAT) - Invert elevations and stationing at pipe tie-in locations and hydrant tee locations

	<ul style="list-style-type: none"> - Location, type and invert elevation of all crossing utilities
Details	<ul style="list-style-type: none"> - Corrosion protection - Deflection angles for horizontal to vertical alignments - Thrust block details

Sanitary Sewer Utilities

Plan	<ul style="list-style-type: none"> - All sanitary mains and service connections - Offsets of sanitary mains from Property line - Pipe size, material, class and type (e.g. 200mm PVC SDR35 SAN) - Manholes and cleanouts - Manhole identification numbers - Direction of flow arrows - Service line inspection chambers c/w invert elevations - Easements: existing and/or required
Profile	<ul style="list-style-type: none"> - Profiles of invert of sewer pipes - Length, size, material, class, type and grade of pipe (e.g. 62.0m 200 PVC SDR35 SAN @ 5.0%) - Manholes and cleanouts - Manhole identification numbers - Pipe inlet and outlet invert elevations at manholes - Manhole rim elevations and stationing - Location, type and invert elevation of all crossing utilities
Details	

Storm Sewer Utilities

Plan	<ul style="list-style-type: none"> - All storm mains and service connections - All perforated "French" drains - Offsets of storm mains from Property line - Pipe size, material, class and type (e.g. 250mm PVC DR35 STM) - Service line inspection chambers c/w invert elevations - Perforated pipe clean out / access points c/w invert elevations - Manholes - Manhole identification numbers
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	<ul style="list-style-type: none"> - Inlet and outlet structures - Catch basins and leads - Drainage features such as ditches, culverts, streams, channels, etc. - Overland flood routing - Direction of flow arrows - Storage area identification of design trapped low points - Erosion protection - Easements: existing and/or required
Profile	<ul style="list-style-type: none"> - Profiles of invert of storm pipes - Profiles of invert of perforated "French" drains - Length, size, material, class, type and grade of pipe (e.g. 62.0m 250 PVC DR35 STM @ 5.0%) - Perforated pipe clean out / access points c/w invert elevations - Manholes - Manhole identification numbers - Pipe inlet and outlet invert elevations at manholes - Manhole rim elevations and stationing - Inlet and outlet structures - Invert elevations and stationing of inlet and outlet structures - Ditch profile line - 100 year Hydraulic Grade Line - Location, type and invert elevation of all crossing utilities
Details	<ul style="list-style-type: none"> - Inlet and outlet structures - Erosion protection specifications

3.4 Site Grading Plan

The Site Grading Plan shall show the following information:

- Information as detailed under sections "1.0 General" and "2.0 Drawing Standards";
- The existing topography;
- Proposed areas of cut and fill;
- All existing corner lot elevations (uncircled);
- All proposed corner lot elevations (circled);
- The proposed building envelope with the Minimum Basement Elevation (MBE) and the Main Floor Elevation (MFE) to +/- 0.3m;
- The slope of the lot (directional arrow);
- Major flood routing; show as arrows and indicate if in pipe or on surface (show an "open" arrow for routes in pipe and a shaded arrow for surface routes);
- Typical lot grading and cross sections, noting a minimum 2% grade on

lots;

- The minor (5 year return) storm sewer system with flows noted per section and the accumulated flows from all upstream sections. Provision must be made for upstream development where applicable;
- The major (100 year return) system. The Consultant shall note wherever the major system is not in the pipe or the roadway, showing the routing and flows for the 100 year return storm;
- All swales proposed to effect the submitted Stormwater Control Plan;
- How the development will affect adjacent lands and historical drainage patterns. Attempts should be made to “meet” existing elevations along the development boundary; and
- A legend noting all items proposed in the Site Grading Plan and applicable “General Notes”.

3.5 Stormwater Control Plan

The Stormwater Control Plan shall show the following information:

- Information as detailed under “1.0 General” and “2.0 Drawing Standards”;
- The development area within the drainage catchment including all features such as roads, natural watercourses, watercourse crossing structures, and low or poorly drained areas (1:2500 scale). A small location plan of the watershed is also to be included;
- Plan view of the existing and proposed drainage systems;
- Contours of existing ground (1.0 m intervals);
- Major flood routing (1:100 year) internal and external to the development;
- Conceptual lot grading patterns;
- Location and size of detention and/or retention facilities including summary of design flows, volumes and control orifice sizing.;
- Areas of major cut or fill (greater than 1.0m);
- Area, in hectares, of development and the total area of drainage basin;
- Directional arrows of flow within the site and on surrounding areas; and
- Sub-catchment boundaries, coefficients and areas.

3.6 Sediment Control Plan

The Sediment Control Plan shall show the following information:

- Information as detailed under sections “1.0 General” and “2.0 Drawing Standards”;
- Existing contours of the site at an interval sufficient to determine drainage patterns;
- Final contours if the existing contours are significantly changed;
- Final drainage patterns/boundaries;
- Existing vegetation such as significant trees, shrubs, grass, and unique

- vegetation;
- Limits of clearing and grading;
- Erosion and sediment control measures (temporary and permanent) including locations and details in accordance with the City of Kamloops Design Criteria Manual;
- Storm Drainage systems including inlets, outlets, pipes, and other permanent drainage facilities (swales, waterways, etc.); and
- Details on Access to inlets, outlets, pipes and other permanent drainage facilities that will require future maintenance by the City.

3.7 Street Lighting Plans

The Street Lighting Plan shall show the following information:

- Information as detailed under sections "1.0 General" and "2.0 Drawing Standards";
- Displayed at a 1:500 scale;
- Locations for street lights, junction boxes, electrical service connections and street light conduit throughout the subdivision;
- Details of lamp standards, luminaries, bases, wiring specifications, and materials; and
- Design information in table format.

3.8 Street Signs, Markings and Traffic Control Devices Plan

The Street Signs, Markings and Traffic Control Devices Plan show the following information:

- Information as detailed under sections "1.0 General" and "2.0 Drawing Standards";
- Identifying all signs, markings and control devices required; and
- Details of traffic control devices.

3.9 Construction Details and Miscellaneous Notes

The Construction Details and Miscellaneous Notes show the following information:

- Information as detailed under sections "1.0 General" and "2.0 Drawing Standards";
- All appropriate municipal standard drawings and details; and
- All appropriate miscellaneous notes.

3.10 Electrical, Gas and Communication Utilities

Per appropriate authority (individual utilities may provide separate drawings).

4.0 Design Drawing Submissions

The final submission shall consist of:

- Five complete sets of drawings;
- Three site grading plans;
- Three general layout plans; and
- Digital PDF.

5.0 Record Drawings and Service Connection Cards

Record drawings must be submitted to the Development and Engineering Services Department. Record drawings shall include construction and design information relevant to the drawing and conform to the City of Kamloops Record Drawing Submittal Guidelines (www.kamloops.ca/development/pdfs/14-RecordDrawingSubmissionGuidelines.pdf). Notes shall be modified to reflect actual construction. The digital AutoCAD file shall contain the record survey points.

AutoCAD data that is forwarded to the City by the Consultant must conform to the requirements and formats set out herein. Failure to comply will result in work being returned to the Consultant for correction at the Consultant's expense.

Service connection cards in the format provided by the City are to be forwarded to the Development and Engineering Services Department at the time of submission of the record drawings. The service records shall clearly show the location of all services.

The following procedures shall be followed in the submission of record drawings for municipal acceptance:

- a. The Consultant Engineer shall submit one complete set of paper record drawings and one complete set of service connection cards to the Development and Engineering Services Department for review. The marked up set of paper drawings and service connection cards will be returned to the Consultant for revisions;

- b. The Consultant Engineer's final record submission shall include:
- 1 complete set of revised record drawings (electronic or paper)
 - 2 full size paper copies of complete set of revised record drawings;
 - 1 set of final service connection cards;
 - The original "marked-up" record drawings and service connection cards;
 - All related electronic record drawing AutoCAD files;
 - 1 complete set of electronic record drawings in PDF format free of security features preventing the City from adding disclaimers, drawing numbers or other information for the purposes of our record management program will be required;
- c. Drawings must contain the following statement, duly signed and sealed by the Consultant:

"The signature and seal of the undersigned on this drawing certifies that the design information contained in these drawings accurately reflects the original design and the material design changes made during construction, that were brought to the undersigned's attention. These drawings are intended to incorporate addenda, change orders and other material design changes, but not necessarily all site instructions.

The undersigned does not warrant or guarantee, nor accept any responsibility for the accuracy or completeness of the as-constructed information supplied by others contained in these drawings, but does certify that the as-constructed information, if accurate and complete, provides an as-constructed system which substantially complies in all material respects with the original design intent."

- d. Record drawings shall include all components identified in "3.0 Required Drawings" except:
- Cover Sheet
 - Sediment Control Plan