



City of Kelowna
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Council Policy

Engineering Drawing Submission Requirements

APPROVED June 4, 2001

RESOLUTION: R375/10/04/26
REPLACING: R1039/08/11/24; R59/99/01/25; R445/01/06/04
DATE OF LAST REVIEW: April 2010

A. GENERAL

The purpose of this section is to outline the minimum standards and requirements the City will accept in the Design and "As-Built" 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 asbuilt drawings, for City records, in accordance with this policy.

Elevations shall be relative to geodetic datum. The horizontal coordinates shall be referenced to the 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.

Chainage shall increase from left to right and from bottom to top on a drawing. North should be at the top or right side of a drawing.

Where a City of Kelowna standard drawing exists, it shall be sufficient to refer to the appropriate drawing by reference number and date of issue. Where a standard drawing does not exist, or is unsuitable for a particular case, detail drawings shall be prepared in consultation with the City of Kelowna Information Services Branch to conform generally with these requirements and so as to accurately portray the various elements of the installation.

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 by discussion with the Information Services Branch.

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

Digital (AutoCAD) drawings will be available from the City of Kelowna Information Services Branch.

B. DRAWING STANDARDS

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

A3 size drawings may be used for paper submissions. As built drawings are to be A1 size unless mutually agreed otherwise.

Title Block

If required, the City will supply an A size block shell drawing on disk 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). Do not include project name, developer name or legal descriptions in title area.

Scales

The following scales shall normally be used:

Location Plans	-	1:2500; 1:5000; 1:10000
Composite Plans	-	1:500
Details	-	1:100; 1:500; 1:20; 1:10
Plan/Profile	-	Horizontal 1:500 or 1:250
	-	Vertical 1:25 or 1:50
Cross-Sections	-	Horizontal 1:100
	-	Vertical 1:25 or 1:50

Legend

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

Media Submissions

Drawings shall be submitted upon the following media types:

- design drawings – paper
- as-built drawings – paper
- as-built drawings – AutoCAD drawing format on a CD

Drawing Appearance

The following are based on AutoCAD conventions and plotted drawing appearance.

Base Layers

Layer Name	Objects (Colour "Bylayer")	Text Style	Layer Colour	Line Type (Ltscale 14)	Layer
State					
Asph Thawed	Existing Edge of Asphalt	N/A	8 – Grey	TBD	On,
Banks Frozen	Top and Bottom of Existing Banks	L60	8 – Grey	Continuous	On,
Blockline Thawed	Road Right-of-Way Lines	N/A	1 – Red	Continuous	On,
Crown Frozen	Existing Road Crown	N/A	8 – Grey	Continuous	On,
Dwy Thawed	Existing Driveways Including Text	L60	8 – Grey	Continuous	On,
Easement Thawed	Existing Easements and S.R.O.W.	N/A	8 – Grey	Dashed	On,
Easetext Thawed	Easement and S.R.O.W. Text	L60	8 – Grey	Continuous	On,
Elec Thawed	Existing Electrical Lines	N/A	8 – Grey	Elec	On,
Ex-Curb Thawed	Existing Curb and Gutter	N/A	8 – Grey	Continuous	On,
Ex-Sidewalk Thawed	Existing Sidewalk	N/A	8 – Grey	Continuous	On,
IP Frozen	Existing IP's	N/A	7 – White	Continuous	On,
Legal Tie Frozen	Existing Legal Tie Lines	N/A	3 – Green	Dashed	On,
Lottext Thawed	Existing Lot Text	L100	8 – Grey	Continuous	On,
MH Thawed	All Existing MH's (Including Identifying Text)	L60	8 – Grey	Continuous	On,
Narrow Thawed	North Arrow	N/A	8 – Grey	Continuous	On,
Otherfeatures Frozen	Any sitefeature not mentioned on sitefeatures i.e. Building, shed, all private property	L60	8 – Grey	Continuous	Off,
PK Frozen	Existing PK Nails	N/A	7 – White	Continuous	On,

Drawing Appearance (Con't):

Plantext Thawed	Existing Plan Text	L120	8 - Grey	Continuous	On,
Propline Thawed	Interior Property Lines	N/A	8 - Grey	Continuous	On,
Road Text Thawed	Existing Road Text	L175	5 - Blue	Continuous	On,
San Thawed	Existing Sanitary Lines	N/A	8 - Grey	San	On,
Sitefeatures Thawed	All Sitefeatures Including - Light Standards, Hydrants, Poles (Utility, Electric, Telephone), All Trees, Catch Basins, Traffic Signs, Fences, Hedges, Bushes, Anchors, Transformers, Vaults, Tel-Ped, Landscaping, Elec-boxes, Walls, Water Meter	N/A	8 - Grey	Continuous	On,
Stm Thawed	Existing Storm Lines	N/A	8 - Grey	Stm	On,
Surmon Frozen	Existing Survey Monuments	N/A	7 - White	Continuous	On,
Tele Thawed	Existing Telephone Lines (Including Cable TV)	N/A	8 - Grey	Tel	On,
UDIM Thawed	All Utility Dimensions	L80	8 - Grey	Continuous	On,
UDIM Thawed	Utility Pipe Description Text	L60	8 - Grey	Continuous	On,
UDIM Thawed	Miscellaneous Descriptions; i.e. Fences, hedges, l.s., hyd, elec box	L60	8 - Grey	Continuous	On,
Water Thawed	Existing Water Lines	N/A	8 - Grey	Wat	On,
WV Thawed	Existing Water Valves	N/A	8 - Grey	Continuous	On,

*****NOTE: ALL OBJECTS COLOUR "BYLAYER"*****

*TBD - To be Determined

Text Height (All Text Leroy.Shx)

<u>Style</u>	<u>Plotted Height</u>
L60	1.4 mm
L80	1.8 mm
L100	2.2 mm
L120	2.6 mm
L140	3.0 mm
L175	4.0 mm

AutoCAD Colour and Pen Widths

<u>Colour</u>	<u>Plotted Pen Width</u>
1 - Red	0.25 mm
2 - Yellow	0.50 mm
3 - Green	0.13 mm
4 - Cyan	0.35 mm
5 - Blue	0.70 mm
6 - Magenta	0.35 mm
7 - White	0.35 mm
8 - Grey	0.18 mm
9 to 255 - Various	0.25 mm

A standard AutoCAD drawing containing layering, symbology and line type definitions will be provided by the City of Kelowna Information Services Branch.

All electronic drawings that use paper space should be set up to plot at 1:1. Electronic drawing units should be meters and objects within should not be moved and/or rotated from the UTM coordinate system.

Electronic files submitted to the City of Kelowna should be in AutoCAD drawing format on a CD.

C. REQUIRED DRAWINGS

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

Note: Asbuilt drawings shall not be combined (unless noted or mutually agreed for that specific project); i.e. storm and sanitary drawings shall not be combined with the road drawings. However, construction drawings may combine various services on one plan but must be clear and readable. Combined services on drawings must be separated for asbuilt submissions.

Cover Sheet

The cover sheet shall note the consultant's name and phone number, a description of the project, the City project number, legal description of the lands involved, a site location plan and a design drawing index.

Composite Plan

The composite plan shall show the area being served with lot numbers, and all Works and Services. Geodetic survey monuments will be shown.

Road Drawings (Plan/Profile)

Both plan and profile stationing must be tied to a property line or road boundary.

Drawings shall show width of road, width of shoulders, and the offset of curb from property line.

Chainages of the B.C. and E.C. of horizontal curves shall be shown together with the delta angle, centreline radius, tangent length, and centreline arc length. Curb radii are not required if the centreline radius and road width are shown, except on curb returns at intersections and at the end of cul-de-sacs.

The percent grade to two (2) decimal places shall be shown on the profile, together with the following information on vertical curves:

- (a) the chainage and elevations of B.C., E.C. and P.I.
- (b) The external value, e.
- (c) The length of vertical curve.
- (d) The chainage and elevation of the low spot of sag curves.
- (e) K value of vertical curvature (crest on sag).

Profiles are to show all relevant surface features including:

- (a) Existing ground elevation along the centreline of proposed roadway and/or the edge of existing asphalt.
- (b) Existing curbs, gutters and sidewalks.
- (c) Elevation of private driveways, doorways, and sidewalks at property line, and any other relevant information.
- (d) The designed gutter and/or centreline grade.

On super-elevated curves and crossfall sections, the drawings shall show a profile of each gutter with pertinent gutter elevations either on the profile or in tabular form.

The profile shall be shown at true centreline length and projected above to the plan in as close a relationship as possible.

The plan shall show the location of catch basins (using road chainage) and catch basin leads.

Water Plan/Profile Drawings (May be combined with road drawing)

The following information shall be shown:

The top half of a Plan/Profile sheet shall show the plan view, and shall show the legal layout, with legal descriptions of all properties, the location of all sidewalks, catch basins, underground utilities such as sewer, water, telephone, television power, manholes, valves, hydrants, 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.

Baselines and proposed works are to be referenced to legal corner(s) on each sheet. Dimensions of road allowances are to be shown on each sheet.

The following information shall be shown on the PLAN VIEW:

- (a) Information as detailed under "General" and "Drawing Standards".
- (b) Offset of pipelines from property lines.
- (c) The length and size of pipe.
- (d) Offset of connections from property lines.
- (e) The locations of manholes, clean-outs and services relating to property lines.
- (f) Information on any curves or deflections, if applicable, to pipe design.
- (g) Easements; existing and/or required.
- (h) Future curb and gutter lines as required.
- (i) The extent of work required of the City of Kelowna to make the connection(s) to existing live mains.
- (j) The location of hydrants, valves, end of the main, services and other appurtenances tied to the nearest property line.

The following information shall be shown on the PROFILE:

- (a) Information as detailed under "General" and "Drawing Standards".
- (b) Surface profiles (existing and design, if applicable) over proposed main.
- (c) Length, size, grade, type, and material of pipe (e.g. 84 m – 200 mm SAN/STM/WATER PVC @ 1.15%).
- (d) Profiles of invert and crown of pipes.
- (e) Percent grades to two decimal places.
- (f) Bedding, backfill and surface restoration requirements.
- (g) Location, type and invert elevation of all crossing utilities.
- (h) Profile only of any existing or proposed storm or sanitary sewers and culverts.

Storm Drains and Sanitary Sewer Drawings (Plan/Profile) (not to be combined with other drawings unless mutually agreed to)

The top half of a Plan/Profile sheet shall show the plan view, and shall show the legal layout, with legal descriptions of all properties, the location of all sidewalks, catch basins, underground utilities such as sewer, water, telephone, television, power, manholes, valves, hydrants, 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.

Baselines and proposed works are to be referenced to legal corner(s) on each sheet. Dimensions of road allowances are to be shown on each sheet.

The drawings shall show the structural details of all manholes and chambers, etc. not covered by standard drawings. Where the sanitary sewers and storm drains or other utilities are to be installed in a common trench, a typical cross-section showing vertical and horizontal distances between pipes and classes of pipe and bedding shall be shown.

The following information shall be shown on the PLAN VIEW:

- (a) Information as detailed under "General" and "Drawing Standards".
- (b) Offset of pipelines from property lines.
- (c) The size of pipe.
- (d) Offset of connections from property lines.
- (e) The locations of manholes, clean-outs and services relating to property lines.
- (f) Information on any curves or deflections, if applicable, to pipe design.
- (g) Easements; existing and/or required.
- (h) Future curb and gutter lines as required.
- (i) The extent of work required of the City of Kelowna to make the connection(s) to existing live mains.
- (j) Manhole identification numbers.
- (k) For pipes servicing lots, inverts of connections at property line (inverts to be "boxed in" for easy identification).
- (l) For pipes servicing lots, basement elevations on each house.
- (m) For sanitary sewer, where service connections are required, location of existing septic tanks.
- (n) For storm drainage, features such as ditches, culverts, streams, channels, etc.

The following information shall be shown on the PROFILE (bottom of sheet):

- (a) Information as detailed under "General" and "Drawing Standards".
- (b) Surface profiles (existing and design, if applicable) over proposed main.
- (c) Length, size, grade, type, and material of pipe (e.g. 84 m – 200 mm SAN/STM/WATER PVC @ 1.15%).
- (d) Profiles of invert and crown of pipes.
- (e) Percent grades to two decimal places.
- (f) Bedding, backfill and surface restoration requirements.
- (g) Location, type and invert elevation of all crossing utilities.
- (h) Invert elevations at both inlet and outlet of manholes.
- (i) Designation of manhole stationing.
- (j) Manhole identification number.
- (k) Profile of any existing or proposed water main(s).

Storm Drains and Sanitary Sewer Drawings (Plan/Profile) (not to be combined with other drawings unless mutually agreed to) (Cont'd)

- (l) For pipes servicing lots, basements elevation with symbols.
- (m) For pipes servicing lots, service connection symbols for invert elevation at the property line.
- (n) Rim elevations of proposed or adjusted manholes, as required.

Lot Grading Plan

Shall be at 1:500 scale and identified as per key plan system if more than one sheet is required. Plan shall note:

- (a) the pre-development contour lines. This topography shall extend a minimum 30.0 m outside the development site;
- (b) all existing corner lot elevations (uncircled);
- (c) all proposed corner lot elevations (circled);
- (d) the proposed building envelope with the Minimum Basement Elevation (MBE) noted;
- (e) the slope of the lot (directional arrow), noting a minimum 1% grade on the lots;
- (f) the minor (10 year return) storm sewer system with the flows noted per section and the accumulated flows from all upstream sections. Provision must be made for upstream development potential where applicable;
- (g) 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;
- (h) all swales proposed to effect the submitted Storm Water Management Plan;
- (i) how the development proposal will affect adjacent lands. Attempts should be made to "meet" existing elevations along the development boundary;
- (j) a legend noting all items proposed in the Storm Water Management Plan. Applicable "General Notes" should also be included.

Storm Water Management Plan (SMP)

- (a) Site and surrounding area (400 m minimum outside development) showing roads and major features (1:2500 scale). A small location plan of the watershed is also to be included.
- (b) Contours of existing ground (1.0 m intervals where slope <20%, 2.0 m >20%) for the site and surrounding area mentioned above.
- (c) Major flood routing (1:100 year); show as arrows and indicate if in pipe or on surface show an "open" arrow for surface routes and the same arrow "shaded" for routes in pipes).
- (d) Detention pond details, if applicable.
- (e) Area, in hectares, of development and the total area of drainage basin.
- (f) Directional arrows of flow within the site and on surrounding areas.
- (g) Sub-catchment boundaries, coefficients and areas.
- (h) Pipe system including size, grade, and minor and major flows (a table may be utilized).
- (i) The subject development is to be highlighted.

Erosion and Sediment Control Plan

This plan is to detail methods and procedures that will be used to prevent or minimize soil displacement and transport of sediment from the Development site. This is to include methods to prevent or minimize soil transport onto adjacent properties or onto existing roads adjacent to the site (i.e. tracking from vehicles). Preventative methods of soil displacement on the site are to be detailed. The drawing shall show the following:

- (a) Existing contours of the site at an interval sufficient to determine drainage patterns.
- (b) Final contours if the existing contours are significantly changed.
- (c) Final drainage patterns/boundaries.
- (d) Existing vegetation such as significant trees, shrubs, grass, and unique vegetation.
- (e) Limits of clearing and grading.
- (f) Erosion and sediment control measures (temporary and permanent) including locations, names and details, in accordance with "Best Management Practices for Erosion and Sediment Control – Upland Works, City of Kelowna" and "Land Development Guidelines for the Protection of Aquatic Habitat – DFO + BCMOE".
- (g) Storm Drainage systems including drain inlets, outlets, pipes, and other permanent drainage facilities (swales, waterways, etc.).

The plan must have a narrative section describing the land, the disturbing activity and details of the methods used for controlling erosion and sedimentation. Include a description of the procedures for construction and maintenance of the control measures. Note the persons involved in maintenance and provide a maintenance schedule that is to be followed.

Street Lighting Plans

Shall be a plan view (1:500) of the street lighting proposal. There shall be General Notes included on the Plan noting reference(s) to the Municipal Standards and Specifications and the appropriate design criteria. Generally, street lights shall be located at all intersections and within 1 m of the side property lines. Any street lighting plan(s) should be accompanied with the photometric calculations.

Street Signs, Markings and Traffic Control Devices Plan

A drawing identifying signs, markings and control devices required. Detailed drawings may be required for traffic control devices.

Traffic Control Plan

Detail routes for construction traffic and traffic controls for traffic on existing roads affected by construction.

Construction Details

Show all proposals for construction which are not covered or specifically detailed in the City Standards and Specifications. Where there is a City Standard, it is expected to refer to the Drawing Number. It is not necessary to include or provide work(s) for which there is a Standard Drawing.

Electrical, Gas and Communication Utilities

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

Road Cross-Section Plans (May be provided separately on 8 1/2 x 11 paper)

Shall be scaled at 1:100 horizontal and 1:50 vertical and shall note the existing ground elevation, the proposed elevations of the road centreline, the curb and gutter (or road edge) and property lines. Cross-sections are required at 20.0 m intervals. The City Engineer may waive or reduce the number of sections required where the information is not beneficial. Additional sections may be required or requested where excessive cuts or fills are involved. These plans may be hand drawn, provided they are of good quality and clarity.

D. DRAWING SUBMISSIONS

The first complete design submission shall consist of:

- Two complete sets of drawings;
- Two lot grading plans;
- Seven composite plans;
- Soils report (to verify road structure design) (Soils reports shall be required on all new road construction design);
- Utility calculations for water, sanitary, storm sewer to confirm that designed is in accordance with Subdivision, Development & Servicing Bylaw;
- Owner/consulting engineering confirmation letter;
- Quality Control and Assurance Plans for:
 - Design;
 - Construction; and
 - Record-keeping all in accordance with Schedule 3 of the Subdivision, Development & Servicing Bylaw.

Subsequent design submissions requiring changes to the previous submission shall consist of:

- Two complete sets of drawings;
- A complete construction cost estimate;
- All submissions subsequent to first submission shall have highlighted with yellow any changes made by the Design Engineer which are in addition to "Red Line" changes required by the City;
- Items "Red Lined" must be addressed by the Design Engineer. Failure to do so will result in submissions being returned.

The final submission shall consist of:

- Four complete sets of drawings;
- Two lot grading plans;
- Five composite plans;

E. CONSTRUCTION ESTIMATE

The construction cost estimate shall be broken down in a format as approved by the City Engineer. These items and costs will be reviewed and amended where or if necessary.

F. AS-BUILT DRAWINGS AND SERVICE CONNECTION CARDS

As-built drawings and service connection cards must be submitted to the Information Services Branch. As-built drawings should include construction and design information relevant to the drawing. Notes shall be modified to reflect actual construction.

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 Information Services Branch at the time of submission of the as-built drawings. The service records shall clearly show the location of all services. If connections are skewed to the property line, the connection shall be located at the main by showing the distances from property lines as well as located at the property line.

The following procedures shall be followed in the submission of "As-Built" drawings for municipal acceptance:

- (a) The Consultant Engineer shall submit two complete sets of paper prints, except for the road cross-section sheet(s), electronic files of the same and a complete set of connection cards for. One marked-up set of the asbuilt paper prints may be returned to the Consultant for revisions.
- (b) Drawings must contain the following statement, duly signed and sealed by the Consultant:

"I hereby certify the new works and services shown on this drawing were inspected during construction and installed in accordance with this drawing, and the Subdivision, Development & Servicing Bylaw No. 7900, including amendments.

Consultant's Seal

Consultant's Signature: _____

Date of Consultant's Signature: _____

- (c) As-built drawings shall include the following drawings:
 - Composite plans.
 - Detailed plan profile drawings for water, sanitary, storm and road works.
 - One lot grading plan.
 - Construction Detail Plans.

Design drawings not requiring "As-Built" but shall be included as paper prints for City records are:

- Storm Water Management Plan.
- Erosion and Sediment Control Plan.
- Street Lighting Plan.
- Street Signs, Markings and Traffic Control Devices Plan

- (d) The Engineer shall also submit the "Assurance of Professional Field Inspection and Compliance Form".

REASON FOR POLICY

To define standards for drawing submissions.

LEGISLATIVE AUTHORITY

Subdivision, Development & Servicing Bylaw 7900, Section 9.2

PROCEDURE FOR IMPLEMENTATION

When consultants present their drawing submissions, the Works & Utilities development division will review for conformance.