

City of Nelson
Subdivision and Development Servicing Bylaw No. _____

1.0 GENERAL

1.1. Introduction

This Policy outlines the minimum standards and requirements for design and as-record drawing submissions for engineering work(s).

Where a *City* 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 to accurately portray the various elements of the installation.

Where no standard is defined in this Policy for the preparation of a drawing to portray a particular service, structure, or other item, instructions and requirements may be obtained by discussion with *City* staff.

1.2. General Requirements

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

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

Elevations shall be relative to geodetic datum. Horizontal coordinates shall be referenced to UTM coordinate system NAD83.

1.3. Abbreviations

| | |
|-------|-------------------------------|
| UTM | Universal Transverse Mercator |
| NAD83 | 1983 North American Datum |
| BOC | Back of Curb |
| EC | End of Curve |
| BC | Beginning of Curve |
| PI | Point of Intersection |

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2.0 DRAFTING STANDARDS

2.1. Sheet Layout

Drawing sheet layout(s) shall conform to and include the following:

- (a) Sheet size to be ANSI D 22x34in (558.8x863.6mm).
- (b) A north arrow shall be placed close to the top right side of each plan view on the sheet.
- (c) A title block which describes the contents of the drawing (eg. Key plan, road, etc) and shall clearly indicate the location of the works by road name(s) and/or legal description.
- (d) Drawing scale, date, revision history block, and a detailed legend shall also be included on each sheet layout.

2.2. Dimensions and Units

The following conventions must be used:

- (a) Dimensions and units must be shown in metric. No imperial units are permitted.
- (b) All distances, elevations, and coordinates shall be given in meters to accuracy of 3 decimal places.
- (c) Grades shall be given as a percentage to accuracy of 2 decimal places.
- (d) Areas shall be in square meters rounded to the nearest square meter.
- (e) All pipe sizes shall be given in millimeters as per ASTM specifications using:
1" = 25mm
- (f) Existing imperial dimensions, except for pipe sizes, are to be soft converted using the factors:
1 inch = 25.4 millimeters
1 foot = 0.3048 meters.

2.3. Lettering

- (a) Lettering is to be an open style of Vertical Gothic (eg. Leroy or AutoCAD – 'romans').
- (b) All lettering to maintain a 1:10 ratio between plotted text height and plotted pen thickness.
- (c) The minimum plotted text height shall be 1.5mm.
- (d) The maximum plotted text height shall be 5.0mm.
- (e) The standard lettering height is 2.0mm.

2.4. Scales

The following scales shall be normally used:

- (a) Location and Key plans - 1:1000; 1:2500; 1:5000; 1:10000
- (b) Composite Plans - 1:500; 1:1000; 1:2500
- (c) Plan/Profile Drawings - Horizontal 1:500 or 1:250 Vertical 1:50 or 1:25
- (d) Cross Sections - Horizontal 1:100 Vertical 1:50
- (e) Details - 1:100; 1:20; 1:10

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3.0 DRAWING STANDARDS (DIGITAL)

3.1. General Requirements

The *Owner* will be required to submit to the *City* a complete set of electronic drawings of the *subdivision* or *development* in AutoCAD DWG format upon completion of the proposed works.

All drawing objects colour and linetype properties shall be set to 'bylayer'.

All drawings must be purged of all unnecessary information prior to submission to the *City*.

3.2. Drawing Conventions

3.2.1. Layer names and Colour

The *City* uses the following convention for naming AutoCAD layers:

<category>-<object>-<type>

Where the available '*categories*' are defined in Table 3.2.1a; and '*objects*' could be lines, mains, manholes, valves, walls, fences, and text; and '*type*' describes the type of object.

For example, concrete could be used to describe a '*type*' of sidewalk as in ROAD-WALK-CONCRETE or ROAD-WALK-TEXT would describe text associated with the sidewalk.

Table 3.2.1-a

| LAYER CATEGORY | CATEGORY DESCRIPTION | COLOUR PEN # |
|----------------|---|--------------|
| COM | Communications (eg. Tel or Cable) | 230-239 |
| ELEC | Electrical | 190-199 |
| GAS | Gas | 190-199 |
| LAND | Landscape Information | 70-79 |
| LGL | Legal Information | 140-149 |
| ROAD | Roads | 20-29 |
| SAN | Sanitary Sewer | 10-19 |
| STM | Storm Drainage | 90-99 |
| STRUC | Structures and Hard Surface Features | 220-229 |
| SURV | Survey Information (eg. Control points) | 40-49 |
| TOPO | Topography (eg. Contours) | 60-69 |
| WAT | Water | 150-159 |

Some common layer examples are:

SAN-MAIN-200mm
ROAD-EDGE-ASPHALT
SURV-POINT-CONTROL

If required layer names may be prefixed as in Table 3.2.1b to signify either existing, proposed, or future works.

Table 3.2.1-b

| PREFIX | DESCRIPTION | RANGE |
|--------|-------------------|---------------------|
| E- | Existing Features | Colours 11-249 odd |
| P- | Proposed Works | Colours 10-248 even |
| F- | Future works | 250-255 |

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3.2.2. Special Layers

Exceptions to the layer naming convention described above are described in Table 3.2.2a

Table 3.2.2-a

| LAYER CATEGORY | CATEGORY DESCRIPTION | COLOUR PEN # |
|----------------|---------------------------------------|--------------|
| _MVIEW | Viewports | 0 |
| _IMAGE | Externally Referenced Images | 0 |
| | | |
| _TITLE | Title Block Data (text and line work) | 180-189 |

3.2.3. Lineweight Conventions

Colours 1-9 are generally used for Title blocks and miscellaneous text and notes.

| | | | | | |
|---|------|-------|---|------|-------|
| 1 | 0.20 | black | 6 | 0.30 | black |
| 2 | 0.30 | black | 7 | 0.20 | black |
| 3 | 0.35 | black | 8 | 0.15 | black |
| 4 | 0.60 | black | 9 | 0.10 | black |
| 5 | 0.20 | black | | | |

Colours 250-255 are generally used for FUTURE works and hatch patterns.

| | | | | | |
|-----|------|------|-----------|------|------|
| 250 | 0.10 | grey | 252 | 0.20 | grey |
| 251 | 0.15 | grey | 253 - 255 | 0.25 | grey |

Colours 10-248 (even) are generally used for proposed works, as follows:

| | | | | | |
|----------------|------|-------|----------------|------|-------|
| 10, 20, 150... | 0.60 | black | 16, 26, 156... | 0.30 | black |
| 12, 22, 152... | 0.40 | black | 18, 28, 158... | 0.20 | black |
| 14, 24, 154... | 0.35 | black | | | |

Colours 11-249 (odd) are generally used for existing works, as follows:

| | | | | | |
|----------------|------|-------|----------------|------|-----------|
| 11, 21, 151... | 0.20 | black | 17, 27, 157... | 0.10 | screen 60 |
| 13, 23, 153... | 0.15 | black | 19, 29, 159... | 0.10 | screen 30 |
| 15, 25, 155... | 0.10 | black | | | |

3.2.4. Linetypes

| | | | |
|--|-----|--|---------------------|
| | W | | WATER MAIN |
| | S | | SANITARY SEWER |
| | FM | | SANITARY FORCEMAIN |
| | □ | | STORM SEWER |
| | B | | GAS |
| | T | | TELEPHONE |
| | TV | | CABLE |
| | H/T | | HYDRO/TEL |
| | U/G | | UNDERGROUND UTILITY |
| | | | PAVEMENT EDGE |
| | | | GRAVEL EDGE |
| | | | BOTTOM OF SLOPE |
| | | | TOP OF SLOPE |
| | X | | FENCE |
| | | | SWALE |
| | | | DITCH |
| | | | VEGETATION BDRY |
| | | | BUILDING |

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4.0 REQUIRED DRAWINGS

4.1. Cover Sheet (Title Page)

In addition to any other requirements presented in this policy, the cover sheet shall show the following information:

- (a) Name of Development or Project.
- (b) Name and address of Owner and Consulting Engineer.
- (c) Site location plan of development or project.
- (d) Legal description of subject properties.
- (e) File numbers of approving authorities, (i.e. City and/or Ministry).
- (f) Complete drawing index of all sheets belonging to the set.

Note: The standards defined Sections 2.1(c), 2.1(d), and 2.3 do NOT apply to the cover sheet.

4.2. Key Plan(s)

In addition to any other requirements presented in this policy, Key Plans shall show the following information:

- (a) Lot numbers, plan numbers, and road names of the subject *development* and adjoining properties.
- (b) Cross reference of the drawings by outlining the area contained in each drawing and referencing that drawing by drawing number.
- (c) General construction notes.

4.3. Building Envelope Plan (if applicable)

In addition to any other requirements presented in this policy, Building Envelope Plan shall show the following information:

- (a) Overall plan of current phase
- (b) Lot numbers
- (c) *Roads*, curbs, gutters and *sidewalks*
- (d) Rights of way and easements
- (e) Offset lines from all property boundaries indicating required building setbacks
- (f) 10 metre by 10 metre square on each parcel indicating the required minimum building envelope
- (g) Notes that indicate the required setbacks from all property boundaries pursuant to the *Zoning Bylaw*

4.4. Composite Plan(s) (as required)

In addition to any other requirements presented in this policy, Composite Plans shall show the following information:

- (a) All existing and proposed utilities, *roads*, *walkways*, and *sidewalks*.
- (b) All rights of way and easements including widths.
- (c) Control monuments with identification number.
- (d) All legal information, including bearings, dimensions, lot numbers, block numbers, legal plan numbers, and street names. All lots must be numbered.
- (e) Show legal lot line dimensions.
- (f) All roadway dimensions including width of right of way, BOC to BOC and BOC to edge of right of way.
- (g) Area of each parcel.

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4.5. Plan / Profile Drawings

In addition to any other requirements of this policy, Plan/Profile drawings shall show the following information:

4.5.1. General

- (a) Both plan and profile stationing must be tied to a property line or road boundary.
- (b) The profile shall be shown at true centerline length and projected below the plan in as close a horizontal relationship as possible.
- (c) 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.
- (d) 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.
- (e) Plan/Profile drawings for various services may be combined on one plan (must be clear and readable) in the following manner:
 - Roads & Storm Drains
 - Sanitary Sewers & Water

4.5.2. Road Plan/Profile Drawings (may be combined with Storm Drains)

Road **plan** views shall show the following information:

- (a) Drawings shall show width of road, width of shoulders, and the offset of curb from property line.
- (b) Chainages of the B.C. and E.C. of horizontal curves shall be shown together with the delta angle, centerline radius, tangent length, and centerline arc length. Curb radii are not required if the centerline radius and road width are shown, except on curb returns at intersections and at the end of cul-de-sacs.

Road **profiles** views shall show the following information:

- (a) The design gutter and/or centerline grade (%).
- (b) Vertical curve chainage and elevations of B.C., E.C. and P.I.; the external value, e; the length of vertical curve; the chainage and elevation of the low spot of sag curves; and, K value of vertical curvature (crest on sag).
- (c) Existing ground elevation along the centerline of proposed roadway and/or the edge of existing asphalt.

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4.5.3. Road Plan/Profile Drawings (may be combined with Storm Drains)

Road **plan** views shall show the following information:

- (c) Drawings shall show width of road, width of shoulders, and the offset of curb from property line.
- (d) Chainages of the B.C. and E.C. of horizontal curves shall be shown together with the delta angle, centerline radius, tangent length, and centerline arc length. Curb radii are not required if the centerline radius and road width are shown, except on curb returns at intersections and at the end of cul-de-sacs.

Road **profiles** views shall show the following information:

- (d) The design gutter and/or centerline grade (%).
- (e) Vertical curve chainage and elevations of B.C., E.C. and P.I.; the external value, e ; the length of vertical curve; the chainage and elevation of the low spot of sag curves; and, K value of vertical curvature (crest on sag).
- (f) Existing ground elevation along the centerline of proposed roadway and/or the edge of existing asphalt.

4.5.4. Water Plan/Profile Drawings (may be combined with Sanitary Sewer)

Water **plan** views shall show the following information:

- (a) Offset of pipelines from property lines.
- (b) Length and size of pipe.
- (c) Offset of connections from property lines.
- (d) The locations of manholes, hydrants, valves, services, end-of-main, or other appurtenances referenced to nearest property line.
- (e) Information on any curves or pipe deflections.
- (f) Easements (existing and/or required).

Water **profiles** views shall show the following information:

- (a) Surface profiles (existing and design, if applicable) over proposed main.
- (b) Length, size, grade, type, and material of pipe.
- (c) Profiles of invert and crown of pipes.
- (d) Location, type and invert elevation of all crossing utilities

4.5.5. Storm Drains and Sanitary Sewer Plan/Profile Drawings

Storm & Sanitary **plan** views shall show the following information:

- (a) 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.
- (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 pipe deflections.
- (g) Easements (existing and/or required).
- (h) Future curb & gutter lines (if applicable).

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- (i) Manhole identification numbers.
- (j) Inverts of service connections at property line (if applicable).
- (k) For storm drainage, features such as ditches, culverts, streams, channels, etc.

Storm & Sanitary *profiles* views shall show the following information:

- (a) Surface profiles (existing and design, if applicable) over proposed main.
- (b) Length, size, grade, type, and material of pipe.
- (c) Profiles of invert and crown of pipes.
- (d) Location, type and invert elevation of all crossing utilities.
- (e) Invert elevations of manholes.
- (f) Alignment station of manhole.
- (g) Manhole identification number.
- (h) Rim elevations of proposed or adjusted manholes.

4.6. Grading Plan(s)

In addition to any other requirements presented in this policy, Grading plans shall show the following information:

4.6.1. General

- (a) Pre-development contour lines. The topographic information shall extend a minimum 30.0m outside the development site;
- (b) proposed contours, slopes, grades, and spot elevations;
- (c) 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;
- (d) the major (100-year return) system. The Consulting Engineer 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;
- (e) all swales proposed to affect the submitted Storm Water Management Plan;
- (f) how the development proposal will affect adjacent lands, attempts should be made to "meet" existing elevations along the development boundary;
- (g) a legend noting all items proposed in the Storm Water Management Plan. Applicable "General Notes" should also be included.

4.6.2. Lot Grading

- (a) all existing corner lot elevations (uncircled);
- (b) all proposed corner lot elevations (circled);
- (c) the proposed building envelope with the Minimum Basement Elevation (MBE) noted;
- (d) the slope of the lot (directional arrow), noting a minimum 2% grade on the lots;

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4.7. Landscape Plan(s)

In addition to any other requirements presented in this policy, Landscape plans shall show the following information:

- (a) extent of proposed landscape works and services;
- (b) existing and proposed property information, including lot lines, easements, legal descriptions, addresses and dimensions;
- (c) existing and proposed contours, slopes, grades and spot elevations for landscaped areas (if not already shown on grading plan);
- (d) existing and proposed buildings, structures, roads, curbs, sidewalks, walls, fences, signs, site features and other appurtenances;
- (e) existing vegetation proposed to be removed, relocated or retained;
- (f) areas of proposed preservation, naturalization, restoration, lawn and landscaping, including soil types, depths and amendments;
- (g) proposed plant species name (botanical and common), size and planting condition;
- (h) existing and proposed irrigation systems; and
- (i) construction details and specifications as required.

4.8. Storm Water Management Plan (SMP)

In addition to any other requirements presented in this policy, Storm Water Management plans shall show the following information:

- (a) Site and surrounding area (400 m minimum outside development) showing roads and major features. 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.

4.9. Erosion and Sediment Control Plan(s)

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. In addition to any other requirements presented in this policy, 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.

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- (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 "Land Development Guidelines for the Protection of Aquatic Habitat".
- (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 and note the persons involved in maintenance and provide a maintenance schedule that is to be followed.

4.10. Street Lighting Plan(s)

A plan view of the street lighting shall be provided. There shall be General Notes included on the Plan noting reference(s) to the Municipal Standards and Specifications and the appropriate design criteria.

4.11. Street Sign, Paint Marking, and Traffic Control Device Plans

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

4.12. Traffic Management Plan(s)

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

4.13. Road Cross Section Plan(s)

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.

4.14. 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.

4.15. Electrical, Gas, and Communication Utilities

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

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5.0 DRAWING SUBMISSIONS

5.1. Design Submissions

Half-size (11X17) drawings will be considered for design submissions with prior approval from *City* staff.

6 paper copies of all design drawings are required for design submissions.

5.2. Record Drawings

Record Drawings must be submitted prior to issuance of a *Certificate of Total Completion*. *Record Drawings* must be delivered in both paper and electronic format(s) to the *City*. The *Record Drawings* shall include a title page, key plan, building envelope plan, composite utility plan, plan profile, details, cross sections, and any other related drawings.

The *Owner* shall submit to the *City* a complete set of electronic drawings of the subdivision or development in DWG format compatible with the current version of AutoCAD in addition to a Digital Hard copy in Adobe PDF format in accordance with Sections 5.3 and 5.4 of this policy.

5.3. Electronic Drawings

5.3.1. General Requirements

The *Owner* shall submit to the *City* a complete set of electronic drawings of the *subdivision* or *development* in AutoCAD DXF or DWG format.

The electronic drawing shall be prepared in accordance with Section 2.0 and the conventions prescribed in Section 3.0.

All external files associated with the electronic drawing (e.g. special fonts, line types, and/or images) shall also be supplied with the electronic drawing submission.

No drawing shall be submitted that contains any external references (xrefs). All externally referenced drawings shall be bound prior to submittal.

5.4. Digital Hard Copies

A digital hard copy is any digital file that is reproducible without the ability to modify the drawings contents or appearance.

5.4.1. General Requirements

Adobe's Portable Document Format (*.pdf) is the preferred file type. However, alternatives will be considered. Alternative formats might be Autodesk's Drawing Web Format (*.dwf) or scanned tif or jpg images.

Drawing sets submitted as a digital hard copy shall be electronically sealed by the *Consulting Engineer*.

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5.4.2. Device/Document Settings for Plotting Adobe Portable Document Format

Ensure all text is legible and the shading and hatching ordered so as not to block or hide other line work and/or text.

The following settings shall be used when plotting the drawings to Adobe PDF:

- paper size to be "22x34"
- layout to be "landscape"
- graphic print quality to be no less than "600 dpi"