



CITY OF COURTENAY
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Specifications for Development Engineering Drawings

This Policy outlines the minimum standards and requirements for Design and Record Drawing submissions for Development Works.

The City's review of the design drawings, calculations and documentation is procedural only to verify conformance with City requirements. By reviewing the design drawings and accepting them for construction purposes, the City does not confirm the adequacy or accuracy of the design nor certify that the design is complete – this responsibility remains with the qualified professional who is required to sign and seal submitted drawings.

Review of the construction design plans is initiated by the concurrent submittal of hardcopy and digital construction plans. A Site Servicing Report and / or Design Narrative is required with the initial submission of construction design drawings to inform of relevant design criteria that govern the submission. Drawings and/or documents with incomplete, non-standard or confusing information will be returned for correction and/or clarification.

These drawing specifications have been organized into the following sections typical for most submittals:

1. General Requirements
2. Title Sheet with Drawing List / Site Location Plan
3. Overall Servicing, Road, Water, Sanitary and Storm Sewer Plans and Profiles
4. Lot Grading Plan
5. Typical Cross-Sections
6. Curb Return Details
7. Detail Plans
8. Street Lighting Plans
9. Signage and Line Painting Plans
10. Third Party Private Utility Coordination Plans
11. Erosion and Sediment Control Plans
12. Street Tree Plans
13. Record Drawing Requirements

1. General Requirements

- a. Drawings shall be neat and legible with the following consideration:
 - Provide adequate clearance margins between the drawing information and the title block border.
 - Linework, symbols, hatching, dimensioning or text shall be clearly differentiated with all conflicts removed.
 - Dimensioning is to be clearly legible and shall be placed so that it will not be misinterpreted.
 - Construction notes shall be boxed with a dimension leader to the drawing feature, in sufficient detail to facilitate construction.

- All drawings shall be in metric measurement; all dimensions shall be shown to the nearest 10mm. All elevations shall be shown to the nearest 10mm except critical sewer elevations which shall be shown to the nearest 5mm.
- b. Standard plotted text size on full-size drawings shall be 1.8 mm to 5.0 mm with a standard of 2.4 mm. There shall be a maximum of 3 text sizes on the drawings.
- c. All drawings shall have the Consultant's name, address and telephone number, project name, drawing title, legal description of the lands involved, drawing number, date, scale and scale bar and drawing revision data.
- d. The following scales should normally be used:

Location Plan	1:750; 1:1,000; 1:2500; 1:5,000; 1:10,000
Overall Servicing Plans	1:500; 1:1,000; 1:2500
Drawing Plans	1:500 or 1:250
Drawing Profile	Horizontal 1:500 or 1:250, Vertical 1:50 or 1:25
Cross Sections	Horizontal 1:100, Vertical 1:50
Curb Return Details	1:150 or 1:200 or 1:250

- e. Elevations shall be relative to geodetic datum, UTM NAD 83 Zone 10N, ground level. A minimum of 2 benchmarks shall be clearly noted on each set of drawings. Preferred benchmarks are fire hydrant arrowheads.
- All drawings submitted to the City must reference datum coordinates (eastings, northings, and elevations).
 - Survey benchmarks locations shall be shown on a plan view.
 - Detail location of geodetic bench mark derivation.
- f. Drawings shall include chainages along the centerline of the road or directly in-line with the asset / utility. The chainage shall be referenced to legal corner(s) on each sheet, or from centerline of intersections and not at an arbitrary location, nor the centre of an intersection, nor from an infrastructure asset (i.e. watermain tie-in or sewer manhole). All centerline chainages shall not overlap the same chainage numbering on another chainage alignment. Chainages shall increase from left to right and from bottom to top on a drawing.

2. Title Sheet with Drawing List / Site Location Plan

The Title Sheet shall show the following information:

- The name of the project or development
- The name and contact information of the owner and the consulting engineer
- The file numbers of the approving authorities
- The legal description of the lands

- A site location plan – this plan shows the phase and / or development boundaries in relation to the surroundings, a north arrow and major road names
- A drawing index complete with revisions numbers

3. Overall Servicing, Road, Water, Sanitary and Storm Sewer Plans and Profiles

- Plans and profiles shall be shown for all proposed roadways, utility rights of way, walkways, trails and bicycle paths. Required elements in the respective Overall Servicing, Road, Water, Sanitary and Storm plans and profiles are detailed below in Tables 1 and 2. Plans and profiles for these utilities may be combined.
- Proposed, existing and future infrastructure design should extend beyond the limits of the development work to show any necessary transitions, connections and the effect of development work on existing City roads and utilities. Where a proposed right-of-way is the continuation of an existing right-of-way or where the work may be extended at a future date the plans and profiles shall extend a minimum of 60m beyond the work to be constructed. Profiles should be aligned horizontally with the plan view.

Table 1 –Required Elements in Plan Views

Plan View Elements

Existing and Proposed Property Lines	•	•	•	•
Limits of Construction and Match Lines	•	•	•	•
Rights of Ways & Easements complete with dimensions	•	•	•	•
Roads, curbs, sidewalks, walkways, driveways, emergency / maintenance accesses	•	•	•	•
Street Names and Legal Descriptions	•	•	•	•
Existing and Proposed Building Structures for Building Permit submissions	•	•	•	•
Municipal utility infrastructure including identification numbers, size, material and locations	•	•	•	•
Legend for all existing, proposed and future features and infrastructure	•			
Development / Phase Boundary Lines	•			
Front yard lot line length	•			
Building Envelopes	•			
Existing Civic Addresses	•			

Overall Layout & Servicing	Road Works	Water Works	Sanitary & Storm
•	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•
•			
•			
•			
•			

Plan View Elements

Community Mail Boxes, fences, trees, hedges and unusual ground features

Natural Features i.e. present natural boundaries, watercourses, riparian / floodplain setbacks
 Top & Bottom of Slopes

Third Party and private utilities, locations within right-of-way

Traffic Islands, Medians, Guardrails, Barricades, Bollards, Gates etc.

Retaining Walls

Flow direction arrows at manholes, drainage channels and inlets/outlets

Drainage Channels, Ditches, swales, culverts and Detention Ponds

Road centreline horizontal curve geometry: B.C. & E.C. chainages, radii and arc length
 Intersecting road & right-of-way chainages

Where Deviations from Standard City Bylaw Dimensions Are Used, label widths of roads, pavement tapers, sidewalks, walkway, emergency access routes and sidewalk offsets to property line

Cross fall grades to two decimal places and chainages where widening or non-typical
 Driveway & Pedestrian letdown locations with dimensions & score lines

Wheelchair ramps, walkway/trails, staircases and railings

Curb changes with transition lengths

Chainages at min. 50m intervals

Chainages of B.C. & E.C. of pipe curves achieved through joint deflections; Pipe centreline 'radius' achieved through joint deflections
 Service point(s) representing municipal services c/w dimension offset from service to sideyard front property corner if non-typical
 Fittings to have the description of hub, flange etc.

Lawn basins referenced to lot corners with grate elevation shown

Storm and sewer service inverts at IC's

	Overall Layout & Servicing	Road Works	Water Works	Sanitary & Storm
Community Mail Boxes, fences, trees, hedges and unusual ground features	•			
Natural Features i.e. present natural boundaries, watercourses, riparian / floodplain setbacks Top & Bottom of Slopes	•	•		•
Third Party and private utilities, locations within right-of-way	•	•		
Traffic Islands, Medians, Guardrails, Barricades, Bollards, Gates etc.	•	•		
Retaining Walls	•	•		•
Flow direction arrows at manholes, drainage channels and inlets/outlets	•			•
Drainage Channels, Ditches, swales, culverts and Detention Ponds		•		•
Road centreline horizontal curve geometry: B.C. & E.C. chainages, radii and arc length Intersecting road & right-of-way chainages		•		
Where Deviations from Standard City Bylaw Dimensions Are Used, label widths of roads, pavement tapers, sidewalks, walkway, emergency access routes and sidewalk offsets to property line		•		
Cross fall grades to two decimal places and chainages where widening or non-typical Driveway & Pedestrian letdown locations with dimensions & score lines		•		
Wheelchair ramps, walkway/trails, staircases and railings		•		
Curb changes with transition lengths		•		
Chainages at min. 50m intervals		•	•	•
Chainages of B.C. & E.C. of pipe curves achieved through joint deflections; Pipe centreline 'radius' achieved through joint deflections Service point(s) representing municipal services c/w dimension offset from service to sideyard front property corner if non-typical Fittings to have the description of hub, flange etc.			•	•
Lawn basins referenced to lot corners with grate elevation shown			•	•
Storm and sewer service inverts at IC's				•

Table 2 –Required Elements in Profile Views

Profile View Elements

Existing and Proposed Property Lines at Road ROW's

Limits of Construction and Match Lines

Horizontal Grid Lines at 10 m intervals (typical) with label every 50 m

Labeled Vertical Grid Lines at 1 m intervals (typical)

Existing & finished ground profile of ROW centreline (or gutter line / edge of asphalt) at true centreline length

Retaining Walls & Elevations

Percent grade to two decimal places

Vertical curve geometry: BVC, EVC, PVI, low and high point chainage and elevation, crest & sag K Factor, curve length

Intersecting road & right-of-way chainages and elevations

Labels for existing ground elevations at minimum 10m intervals along the centreline or edge of asphalt

Streetlight chainage and top of base elevations

Top of rim elevations at centre of lid or barrel. Label manhole diameters and drop structures as applicable

Identification numbers for aboveground infrastructure

Existing and proposed municipal pipe and appurtenances incl. size, length, grade, material, inverts and elevations

Chainages and radius of B.C. & E.C. of pipe curves achieved through joint deflections

Pipe fittings, deflections and bends complete with chainage & elevation

Length and grade of pipe between grade changes

Profiles of invert and crown of pipes

Location, type and invert elevation of all crossing municipal pipes and 3rd party utilities with dimensioning of the pipe outer walls clear separation

Invert elevations of inlet, outlet and branch lines placed to represent the beginning and end of each pipe run shown

Notation where a new sewer ties to an existing stub the grade and the balance of the distance to the existing manhole

Retaining wall drains & cleanouts

Chainage of storm drain inlets, outlets, grates, centre of manhole barrels

Top of grate elevations at gutterline (unless shown on Plan View)

Grades of existing & proposed watercourses & drainage channels

Road Works	Water Works	Sanitary & Storm
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●		
●		
●		
	●	●
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		●

4. Lot Grading Plan

- a. The Lot Grading Plan shall show existing and proposed contours at maximum 1m intervals where the slope of the ground is 5% or greater or at 0.5m spacing where the slope is less than 5%. Where the slope of the existing ground is in excess of fifteen (15) percent contour lines at two (2) metres or less spacing shall be shown with major contours (every 10 metres) in bold. The pre-development contours lines are to extend a minimum of 30.0m outside the development site where feasible. Provide the elevations of centreline of roadways at 10m intervals, and the locations of storm drain inlets.
- b. For each lot provide an elevation of the building to be constructed per MMCD Design Guidelines 2014, Stormwater Management, 4.6 Minimum Building Elevations (MBE). Each lot shall show the building envelope, retained trees. Building permit submittals are to additionally show details of the grading around the building to direct surface storm water flow away from the building and any other necessary grading or drainage features.
- c. The Lot Grading Plan shall provide the following information:
 - Roadways, walkways, utility rights of way, property lines, street lights, legal descriptions, civic addressing, infiltration systems, street names, construction limits.
 - Existing and design spot elevations at proposed lot corners and grade breaks.
 - Storm and sewer service inverts at inspection chambers.
 - Drainage easements and rights-of-way.
 - Direction flow arrows for overland slope/direction of sheet flow for each proposed lot, noting the minimum percent grade on the lots.
 - Proposed grade breaks, catchlines, changes in direction of sheet flows etc.
 - Directional arrows for major rainfall event overland flow route(s) and/or major piped drainage paths.
 - Areas of fill within right-of-ways and building envelopes in excess of 0.6m.
 - Stormwater inlet locations, top of lawn basin grates with inlet invert elevations.
 - Flood construction levels.
 - Riparian and floodplain setbacks.
 - Retaining walls shall be shown with elevations at start and end of the top of wall and bottom of footing and where there is a change in grade. Wall drains and cleanouts are to be shown.
 - Driveway locations
 - Any areas identified as susceptible to load bearing stressors, and areas of unstable soil on and adjacent to the development.
 - For multi-family, commercial and industrial permit show the location, dimension and final gradient of parking and driveway accesses
- d. Where any design ground elevations are below the pavement edge and directed towards adjacent private property the plan shall show the method of removing surface water.

5. Typical Cross-Sections

- a. Typical and unusual cross-sections shall be provided, including corridors reserved for each utility. Cross-sections are required depicting existing, interim (if applicable) and final aboveground and underground conditions.
- b. Typical cross-sections shall span the full width of the road allowance and any tapers into private property.
- c. Typical road cross-section designs shall be by road classification and shall provide the following information with dimensioning provided:
 - Road structure details and design elements including depths of gravels and asphalt, asphalt lifts, boulevard fill material and depth, etc.
 - Pertinent topographical features (i.e. ditches)
 - Property lines
 - Final cut and fill slopes to existing ground
 - Edges and crown of existing and proposed roadways, center of right-of-way
 - Existing ground and all finished surfaces
 - Grades of boulevards
 - Slope to two decimal places

6. Curb Return Details

- a. The following information shall be shown on the Curb Return Plans:
 - Geometric Curve Data for each Curb Return includes radii and radial curb length at curb faces, Beginning of Curve (BC) and End of Curve (EC) chainages.
 - Details of intersections and curb returns and cul-de-sac bulbs, complete with edge of pavement spot elevations at 22.5° intervals, starting at midpoint of cul-de-sac's edge of pavement with balance (if any) of arc radius divided equally between adjacent to curb returns. Final grade elevations shall be provided at either edge of pavement or gutterline for each segment. Curb returns with a delta angle less than 45° shall have spot elevations at BC, EC and midpoint of the arc length.
 - Spot elevation at radial points of cul-de-sacs and bulb-outs.
 - Percent grade of gutter between each spot elevation to 2 decimal places.
 - Edge of Pavement Grade or Gutter Grade and flow directional arrow for stormwater entering and exiting curb return.
 - Road crossfall grades at beginning and end of curb returns.
 - Road crossfall and radial grades within cul-de-sacs and bulb-outs.
 - Manholes, catchbasins, air valves, flush-outs, etc. and provide rim elevations.

7. Detail Plans

- a. Standard details such as manholes, catch basins, hydrants etc. that are shown and / or described through City Bylaws need not be provided in detail on the drawings; the Standard Drawing No. shall be quoted on the plan for reference. If it is necessary to make a change to a standard detail, the detail shall be included on the detail sheet with the revision highlighted with a revision cloud / bolding.
- b. Provide details of special protection for pipe sections which are exposed to steep grades, high velocities or which require corrosion protection or insulation.
- c. Provide details on placement on fill, tunneling, or pipe jacking if such special methods are envisaged.
- d. Provide details of municipal piping where proposed to be in a common trench with over a meter vertical separation to verify that there is adequate horizontal separation to prevent undermining during future excavations.
- e. Where warranted show the methodology and detail (including section views) for all tie-ins.

8. Street Lighting Plans

- a. Street Lighting Plans shall be provided with the following considerations:
 - Scaled for the current phase of development of development
 - Include a schematic of the works including the proposed power supply location, a photometric plan of existing and proposed lighting and a table verifying the average illumination and uniformity.
 - A table shall be provided with load calculations for the electrical loads for each new distribution base and each existing distribution base providing power to new streetlights. Details of the streetlight style, height and colour are required.
 - General Notes referencing MMCD and City of Courtenay Supplementary Specifications for the appropriate design criteria.
 - The street light drawings shall include Roadways, walkways, utility rights of way, property lines, community mail boxes, legal descriptions, street names, municipal utility and 3rd party utility surface features, service points and construction limits.
- b. The following information shall be shown on the Street Lighting Plan:
 - Street light pole type and locations (with chainages noted).
 - Base elevations (if not already shown on Road Plan or Profile)
 - Part number for each type and wattage of luminaire.
 - Pole types and luminaire mounting height.
 - Arm length to luminaire.

- Effective luminance and illuminance coverage of the existing adjacent streetlights and the proposed streetlights
 - Conduit, junction box and service panel locations tied to property lines
 - Locations of existing and proposed hydro and telephone poles.
 - Size of ducts, type and size of wire.
 - Location of grounding points.
 - Notes regarding electrical contractor to coordinate lockout procedure with City (if power to be supplied from an existing street light distribution base).
 - A legend shall be provided for all existing, proposed and future lighting features and infrastructure.
- c. An overall Streetlighting Plan (when required - typically for multi-phase developments) shall be scaled to show all existing and proposed works and services for the current and previous phases of multi-phase developments. Multiple sheets are permitted for larger sites to provide clarity at an acceptable scale. The Overall Streetlighting Plan shall provide a table with load calculations for the electrical loads for each new and existing distribution base within the current and all previous phases.

9. Signage and Line Painting Plans

- a. This drawing shall include roadways, walkways, emergency and maintenance accesses, traffic islands, medians, guardrails, barricades, fences, utility rights of way, property lines, legal descriptions, street names, municipal utility and 3rd party utility surface features, construction limits and any other municipal or private infrastructure that would affect sign placement and sightline visibility.
- b. Traffic markings and signage information to be provided include:
- Locations of street name signs and traffic control, regulatory, warning and information signs.
 - Details of sign types, locations, installation, construction.
 - Details of custom signs including dimensions, fonts, text size, colours etc.
 - Pavement markings.
 - Traffic Signals and associated conduits and junction boxes
- c. Intersection Sight lines. Additional plan and/or profile sight lines may be required for driveway accesses to verify TAC compliance with regards to intersection and/or access sight lines and visibility through vertical and horizontal curves. Detail any Restrictive Covenant and/or Road Dedication areas and requirements.

10. Third Party Private Utility Coordination Plans

Must be based on the individual plans submitted by each utility for the proposed works and clearly indicate all potential conflicts with other major utilities, services and appurtenances. The following shall be on the plan:

- Municipal utilities, street lights, driveways and service locations
- Alignments and all pertinent information shall be provided for all third party utilities.
- A legend shall be provided for all existing, proposed and future features and infrastructure.

11. Erosion and Sediment Control Plans

Approved Erosion and Sediment Control Plans are required prior to the Pre-Construction Meeting.

This plan must describe methodology used for controlling erosion and sedimentation including procedures required during construction as well as during ongoing maintenance. The plan shall identify:

- List of Erosion and sediment control measures to be implemented (temporary, staged, and permanent)
- This drawing shall include roadways, property lines, legal descriptions, street names, construction limits, and storm drainage systems including drain inlets, outlets, pipes, and other permanent drainage facilities (catch basins, swales, waterways, etc.).
- The person(s) responsible for ongoing maintenance
- Existing contours of the site at an interval sufficient to determine drainage patterns.
- Final drainage patterns/boundaries.
- Existing vegetation such as significant trees, shrubs, grass and unique vegetation.
- Limits of clearing and grading.
- Frequency of inspections and submissions of reports to the City by an Environmental Monitor.

12. Street Tree Plans

This drawing shall show all proposed street trees as well as roadways, utility rights of way, property lines, legal descriptions, street names, service point connections, driveways, street lights, municipal utility and 3rd party utility surface features, construction limits, a legend and any other municipal or private infrastructure that would affect placement of street trees.

13. Record Drawing Requirements

- a. Service record cards shall be submitted in pdfs electronic files that are scaled to show all existing and proposed works and services for the entire property, and the mains within the rights-of-way. Multiple cards are permitted for larger properties to provide clarity at an acceptable scale. Each Service Record Card shall include the following:
- Water, sanitary and storm service laterals to each lot. Each service to be dimensioned to a property corner.
 - Mains within rights-of-ways are to be labelled for size and material.
 - Depth of sanitary and storm service inverts at property line.
 - Length of service lateral from the main to inspection chamber or meter setter.
 - Distance from the sanitary and storm fitting on the main to the nearest manhole, the type of fitting at the main and manhole identifier must be included.
 - Any bends in the service laterals are to be noted.
 - The installation date is to be noted.
 - Materials and sizes used for each service lateral.
 - Legal description and civic address.
 - North arrow to be provided at the upper right of the plan
 - All easement and statutory rights-of-way restrictions.
- b. Record drawing submissions require paper hard copy submissions as well as a multi-page PDF electronic file. As part of the final submission, electronic record drawings are to be stamped / signed by the engineer of record. If a record drawing is stamped / signed by the engineer and then scanned, a PDF file directly from the CAD software is required as well.”
- c. Record drawings shall contain and reflect all design modifications incorporated into the completed project and all revisions to the previously approved construction plans. The as-built plans shall include:
- All easements and statutory right-of-ways shown on the final recorded plat.
 - The As-Built drawings shall reflect the true elevation and location of all constructed features, in both the plan and profile views. Record Drawing elevations will be to 2 decimals.
 - 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.
 - All service connections shall be shown with dimensions to property lines.
 - New civic addresses.