

3. DESIGN SPECIFICATIONS

3.1 General

- 3.1.1 The Design Specifications apply to the design of sanitary sewers, storm drains, waterworks, roadways, and street lighting, within the Municipality. They also apply to the location and coordination of other utilities within the Municipality.
- 3.1.2 No departure from the Design Specifications shall be permitted without the prior written approval of the Director of Engineering Services.
- 3.1.3 Any information received from the Municipality about existing services shall be used as a guide only. The Municipality takes no responsibility for the exactness of service information obtained from plates and drawings. The Applicant should confirm underground locations with utility companies and should verify the locations and elevations of all existing services by actual survey.

3.2 Design Drawings

- 3.2.1 Electronic Drawing Standards
 - 3.2.1.1 All design drawings shall be created using AutoCAD, release 14 or later.
 - 3.2.1.2 Circulation submissions shall be on paper prints. Final design submissions shall be in black ink on vellum, paper or mylar (suitable for photocopying), signed and sealed by the Consulting Engineer. Sealed design drawings will be returned to the Consulting Engineer once they have been signed by the Municipality and sufficient copies have been made.
 - 3.2.1.3 As-constructed record drawings shall be on paper and in digital format.
 - 3.2.1.4 The Municipality will provide digital drawing templates and layer conventions (naming, colors, line types, line widths etc.) on request. The Consulting Engineer is to ensure that they use the most recent version of Saanich's drawing standards and conventions.
- 3.2.2 Sheet Sizes
 - 3.2.2.1 Standard sheet size is A1 metric size 594mm x 841mm.
- 3.2.3 Plan/profile Layouts
 - 3.2.3.1 Plan view shall be in the lower half of the sheet, with a Municipal title block along the bottom edge of the sheet.
 - 3.2.3.2 Profile view shall be 1 x 5 lines to the centimetre and occupy the upper half of the sheet.
 - 3.2.3.3 The use of plan on one sheet and profile on a second sheet is not acceptable.
 - 3.2.3.4 A north arrow, generally orientated towards the top of the sheet, shall be shown on the design drawing.
 - 3.2.3.5 Construction notes shall be confined to a separate "note" column, wherever possible, with numbered references in plan or profile.

3.2.4 Scales

Normal:	Horizontal 1:500	Vertical 1:100 or 1:50
Details: *	Horizontal 1:250	Vertical 1:20 or 1:50
Cross Sections:	Horizontal 1:100	Vertical 1:100
Structural Details	1:20	

* e.g. a detail of piping around two closely spaced manholes

3.2.5 Proposed and Existing Services

3.2.5.1 Proposed construction shall be shown as heavy dashed lines. Existing works and services shall be shown as solid lines and shall be screened to 60% or else drawn with very fine lines to create the same effect as screening.

3.2.5.2 Existing watermains, sanitary sewers, and storm drains (including all appurtenances), as well as ditches, pavement, curbs, sidewalks, underground wiring, gas, poles, trees, service connections and other underground utilities shall be indicated in plan and profile where applicable.

3.2.5.3 All services shall generally be shown on one plan with curbs (mountable or non-mountable), sidewalks, sewers, drains, gas, water, and underground wiring and poles identified as MC or NMC, S/W, S, D, G, W, and U/G, H or T respectively. Other services shall be clearly designated on the drawing.

3.2.5.4 Dimensioning of drawings shall be given from an existing or proposed iron pin or lot line. Road chainage shall be tied to an iron pin from the start of construction. All proposed works and services shall be fully dimensioned.

3.2.5.5 Connections or alterations to existing watermains, sanitary sewers and storm drains by the Municipality shall be indicated on the design drawings. The area(s) of work by the Municipality shall be delineated with an ellipse(s) and referenced by notes.

3.2.6 Elevations and Vertical Datum

3.2.6.1 Vertical control shall be shown in metric geodetic datum (mean sea level = 0). Bench mark numbers, locations and elevations can be obtained from the Municipality. The reference bench mark and elevation shall be shown on the design drawing. Elevations below zero (0) metres geodetic shall be hi-lighted.

3.2.6.2 The design drawings shall show:

- the elevation, to the nearest centimetre, of all survey pins
- existing basement floors and,
- where the building site is less than 1m above the road level, any proposed basement floor elevation.

3.2.6.3 If a subdivision lot is proposed to be filled, the drawings shall show existing ground elevations at corners of the allowable building envelope or show a centre of lot profile, to indicate the extent of fill required. The placement of fill must be done under the direct supervision of a Consulting Engineer and the Owner shall supply a signed and sealed report from the Consulting Engineer attesting to the suitability of the placed fill for building.

- 3.2.7 Requirements for Subdivision Key Plan
- 3.2.7.1 A key plan shall be included on the design drawings for subdivisions or if the location of the works cannot be easily deduced from the detailed design plans.
- 3.2.7.2 A key plan, when required, shall be on the right side of the design drawing and shall include the following information:
- 3.2.7.2.1 Plan of adjacent streets and existing lots with streets named and legals of adjacent lots given;
- 3.2.7.2.2 Civic address with the property being subdivided shown shaded;
- 3.2.7.2.3 North arrow;
- 3.2.7.2.4 The location of existing and proposed hydrants;
- 3.2.7.2.5 Contours at minimum 5 m intervals;
- 3.2.7.2.6 Title "Proposed Subdivision of (give the full legal description) ";
- 3.2.7.2.7 If the subdivision is to be developed in stages, each proposed stage shall be clearly outlined and order of development indicated.
- 3.2.7.3 If a key plan is not required, the house number of existing houses shall be shown on the detailed design plan.
- 3.2.8 Rights of Way and Easements
- 3.2.8.1 All existing statutory rights-of-way or easements and their permitted uses must be checked through the Land Titles Office and shall be shown lightly shaded on the design drawing. Registration numbers shall be shown.
- 3.2.8.2 All proposed rights-of-way for new services are to be shown as a dashed line. These shall be tied to the iron pin in each lot, together with their width, permitted use, and the note "acquire" or "proposed".
- 3.2.9 Subdivisions
- 3.2.9.1 The potential building envelope of each lot is to be indicated by shading.
- 3.2.10 Roads and Parking Areas
- 3.2.10.1 Show all iron pins adjacent to the works and the existing ground elevation at each pin or proposed pin.
- 3.2.10.2 Both plan and profile shall be tied to an iron pin, preferably near or at 0+00 chainage. If the chainage exceeds 120 m, a second tie shall be shown.
- 3.2.10.3 Show the road width, curb and sidewalk offsets measured from the property line.
- 3.2.10.4 Show actual location and dimensions of sidewalk drops, on a detail plan at 1:250 if required for clarity.
- 3.2.10.5 Road profiles shall show gutter elevations except where there are no curbs, in which case the profile shall show centreline elevations. On superelevated curves, the road profiles shall show gutter elevations for both sides.

- 3.2.10.6 Gutter elevations of cul-de-sacs shall be shown on a detail plan at 1:250, at all BC's and EC's and at intervals of no more than 5 metres along the gutter line. A profile along the gutter line shall be shown if any grade across a turn around exceeds 4%.
- 3.2.10.7 A cross sectional view of road construction shall be included when circumstances require special consideration. In all cases the standard drawing section shall be referenced on the drawing.
- 3.2.10.8 The profile shall be shown at true centreline length and provided in as close relationship as possible to the plan.
- 3.2.10.9 Locate catch basins by chainage to the centre.
- 3.2.10.10 Existing and proposed critical driveway locations within the subdivision shall be shown, as well as a profile of each of those driveways from the road centreline to the end of the driveway within the property.
- 3.2.10.11 Locate barricades.
- 3.2.10.12 Chainage of the BC and EC of horizontal curves shall be shown together with the internal angle, tangent length, arc and centreline radius. Curb return radii shall be shown.
- 3.2.10.13 The percent grade to two decimal places shall be shown on the profile together with the following information on vertical curves:
- 3.2.10.13.1 The chainage and elevations of BVC, EVC, and VPI;
 - 3.2.10.13.2 The external value, 'e' ;
 - 3.2.10.13.3 The 'K' value;
 - 3.2.10.13.4 The length of the vertical curve;
 - 3.2.10.13.5 The elevation and chainage of low points for sag curves.
- 3.2.11 Sewer and Drains
- 3.2.11.1 The following information shall be shown on the profile:
- 3.2.11.1.1 Size, type, class of pipe, class of bedding;
 - 3.2.11.1.2 Percent grades to two decimal places.
 - 3.2.11.1.3 Invert elevations at both inlet and outlet of manholes;
 - 3.2.11.1.4 Details of vertical curves.
 - 3.2.11.1.5 Existing utilities.
- 3.2.11.2 The following information shall be shown on the plan:
- 3.2.11.2.1 Details of horizontal curves.

- 3.2.11.2.2 Pipe offsets from property line;
- 3.2.11.2.3 Chainage from the downstream manhole of service connections. Offset to the nearest property corner of the end of the service connection.
- 3.2.11.2.4 The grade of service connections from the upper end to the drop to the main, if other than two percent.
- 3.2.11.3 The following additional information shall also be shown on the appropriate part of the drawing:
 - 3.2.11.3.1 Letter sanitary sewer manholes and cleanouts;
 - 3.2.11.3.2 Number storm drain manholes, cleanouts and silt traps;
 - 3.2.11.3.3 Structural detail of all manholes not covered by Municipal Standard Drawings or MMCD.
- 3.2.12 Water
 - 3.2.12.1 Drawings shall indicate whether a watermain passes over or under other underground services which it is crossing.
 - 3.2.12.2 The following information shall be shown on the profile:
 - 3.2.12.2.1 The size, type and class of pipe, and class of bedding.
 - 3.2.12.2.2 For mains 200 mm and larger, profile grades to 2 decimal places.
 - 3.2.12.3 The following information shall be shown on the plan:
 - 3.2.12.3.1 The offset of the main centreline from the property line.
 - 3.2.12.3.2 The proposed elevation of the flange of hydrants.
 - 3.2.12.3.3 Extent of work required of the Municipality in making the connection to the existing watermain.
- 3.2.13 Other Utilities
 - 3.2.13.1 Design details or as-constructed record drawing information for utilities such as Hydro, Telephone, Cable, Telecommunications and Gas shall be obtained from the appropriate utility company. A copy of the utility company's design drawings must be submitted to the Municipality with the design circulation package.
 - 3.2.13.2 The following information shall be shown on the utility design drawings:
 - 3.2.13.2.1 Existing utilities.
 - 3.2.13.2.2 Utility offset from property line and/or iron pin.
 - 3.2.13.2.3 Lot connections and other appurtenances.
 - 3.2.13.2.4 Proposed poles shall be dimensioned from the pole's road face to property line and/or pin.
 - 3.2.13.2.5 Indicate how utility vaults will drain to the storm drain system and who will install the drain connection.

3.2.13.3 Underground hydro, telephone, cable, telecommunications and gas services shall be shown schematically on the Applicant's design drawings.

3.3 As-Constructed Record Drawings

3.3.1 Submission Sets

3.3.1.1 Within four weeks of completion of all services installed by the Applicant, the Consulting Engineer shall deliver "as-constructed" record drawings to the Municipality. These drawings shall include the following statement signed, sealed and dated by the Consulting Engineer:

"I certify that the following services (name them) were inspected during construction and to the best of my knowledge, were installed in accordance with the Engineering Specifications and as shown on this drawing."

3.3.1.2 The first submission of as-constructed record drawings shall consist of one paper print of the approved design drawing with changes or corrections highlighted in colour.

3.3.1.3 After approval of the paper print submission, a digital copy of the original design drawing, revised as required to show services as-constructed, shall be submitted.

3.3.2 Colors

3.3.2.1 The as-constructed drawings shall clearly show the location of all services as installed, using offsets from survey pins. The extent shall be shown by inking the constructed service in the appropriate colour. The locations will be shown either by check-marking any original dimension on the drawing (if they are correct) or by showing the revised dimension beside the original dimension. In addition, the location to the end of underground pipe shall be shown.

Sanitary sewer	red
Storm drains and culverts	green
Water	dark blue
Gas	brown
Curb, sidewalk and road	orange
Lighting	pale blue
Underground - Power	purple
Telephone	purple
Cablevision	purple

3.3.3 Tolerances

3.3.3.1 All horizontal dimensions shall be to the nearest 150 mm. All vertical elevations shall be to the nearest 3 mm, except that ground elevations and service connection inverts at property line shall be to the nearest 30 mm.

3.3.3.2 Road horizontal locations shall be to the nearest 30 mm;

3.3.3.3 Road vertical locations shall be to the nearest 15 mm.

3.3.4 Roads Curb and Sidewalk

3.3.4.1 Locate the end of curbs, sidewalks and pavement.

3.3.5 Sewer and Drains

- 3.3.5.1 Show the location and extent of rock cuts and hardpan requiring blasting.
- 3.3.5.2 Show the invert elevation at both inlet and outlet of manholes.
- 3.3.5.3 Tie locations of manholes, cleanouts and other appurtenances to a minimum of two iron pins.
- 3.3.5.4 Locate catch basin leads at the main by measurement from the centre of the downstream manhole.
- 3.3.5.5 Locate service connections at property line showing distance from the nearest survey pin and at the main by chainage from the centre of the downstream manhole.
- 3.3.5.6 Show ground and invert elevations of sewer and drain service connections at the property line or edge of right-of-way.

3.3.6 Water

- 3.3.6.1 Show domestic water services and tie them to lot corner survey pins.
- 3.3.6.2 Show the location and extent of rock cuts and hardpan requiring blasting.
- 3.3.6.3 Show the profile of the main, indicating the invert elevations at 15 metre stations.
- 3.3.6.4 Tie the locations of fire hydrants to a main valve and to survey pins.
- 3.3.6.5 Locate all valves and tie to a minimum of two property pins.

3.3.7 Other Utilities

- 3.3.7.1 Show the location and dimensions of service connections and all surface appurtenances, tied to property pins.

3.3.8 Street Lighting and Traffic Control

- 3.3.8.1 Show the location of luminaires, tied to property pins.
- 3.3.8.2 Show the location of conduits, using a line diagram.
- 3.3.8.3 Show connection points to B.C. Hydro and photo electric controllers.