



3.0 PREPARATION OF ENGINEERING DRAWINGS

The following specifications will govern the preparation of the Engineered Drawings for all County Developments.

3.1. Design Drawings

- 1) All detailed Engineering plans submitted for review and approval must comply with the specifications herein stated.
- 2) Clarity and legibility shall be the governing criteria when preparing drawings.

3.2. Procedure

3.2.1. Drawing Size, Material

The Standard Drawing size, Arch D sheet (610 mm x 914 mm), Landscape orientation, will be used. Originals will be prepared in ink on Mylar sheets.

3.2.2. Scales

Urban Residential/Industrial and Rural Industrial drawings shall be prepared using the following scales:

- 1) Overall Plans 1:500
- 2) Plan/Profile Horizontal 1:500 Vertical 1:50
- 3) Cross-Sections Horizontal 1:100 Vertical 1:50

Rural Residential drawings shall be prepared using the following scales:

- 1) Overall Plans 1:2000
- 2) Plan/Profile Horizontal 1:2000 Vertical 1:50
- 3) Cross-Sections Horizontal 1:2000 Vertical 1:50



3.2.3. Drawing Technique

Points of drawing technique that are significant to the preparation of drawings are as follows:

- 1) Care in ensuring balanced distribution of detail throughout the drawing.
- 2) Letters and figures shall be clearly legible, 2 mm size or larger (Leroy or equivalent), well spaced, properly formed and proportioned.
- 3) Lines shall be uniform in weight and density.
- 4) Dimensioning shall be in the SI metric system. Dimensioning of a drawing is extremely important and should be such that it will not be misinterpreted. Dimensions should be given from an iron pin, lot line, a centreline or any other reference that can be readily established. Wherever possible, all dimensions shall be provided to a minimum of two (2) property lines.

3.2.4. Title Block

All drawings must clearly show the following in the title block:

- 1) Developer's / Owner's Name.
- 2) Developer's Engineer or consulting Engineer's name.
- 3) Subdivision name, including staging and / or phasing.
- 4) Drawing name, number and issue date.
- 5) Drawing scale, including horizontal and vertical axis.
- 6) Space for dates and signature of the designer, draftsman, reviewer or checker, and approving professional or principal.
- 7) Space for professional stamps and permits.
- 8) Space for revisions, including number, date, description, and approved signature.



3.2.5. General Requirements for All Drawings

The Plan/Profiles, Standard Detail Drawings, and Typical Cross-sections shall be drawn to avoid clutter and promote clarity and legibility.

Elevations will be relative to the Geodetic datum. The reference bench marks and elevations will be shown on the design drawings.

A north arrow, the name of the subdivision and, where appropriate, phase as included in the Development Agreement, adjacent lots and plan numbers, street names and the legal description of the parcel being subdivided, will all be shown on the drawing. In general, the north arrows should be orientated toward the top of the plan.

An Engineer's stamp and Permit to Practice stamp, signed by an Engineer registered in the Province of Alberta shall be shown on the engineering drawings.

3.2.6. Required Engineering Drawings

The drawings identified shall clearly highlight the detail as indicated:

1) Cover Sheet:

This will show the name of the subdivision, stage of development, location plan, County logo, and names of the planner, Developer and Developer's Engineer/representative. Space permitting, the index plan may be included here. A key plan of the County, or a significant portion thereof, shall be included, illustrating the location of the development or project.

2) General Legend and Abbreviations Plan

This plan shall indicate and define all symbols and abbreviations used in the remainder of the engineering drawings.



3) Index Plan:

This plan shall be prepared at a scale of 1:1000 or a reduction thereof to fit the standard size, Arch D sheet (610 mm x 914 mm). Landscape orientation, shall indicate that portion of the street which relates to a particular plan/profile sheet.

This sheet shall list each drawing included in that particular set of drawings. Each drawing name is to be listed sequentially along with its corresponding drawing number. Also included on this plan shall be a Key plan in sufficient detail to show the location of the project with respect to major roads and built up centers.

4) Contour Plan:

This plan will be drawn at a scale of 1:1000 and will indicate the existing contours at 1.0 m intervals (rural developments) and 0.50 m intervals (urban developments), the proposed land use and all significant above ground features, such as buildings, structures, trees, utilities and water bodies.

5) Sanitary Sewer, Storm Sewer and Water Main Overall Plan:

This plan will be drawn to a scale of 1:500 and will indicate the alignments and locations of mains, size of mains, valves, hydrants, manholes, catch basins, and storm catchment areas with areas labeled in hectares, direction of sewer main flows and locations of appurtenances.

6) Road, Sidewalk and Walkway Plan:

This plan will be drawn to a scale of 1:500 and will show all locations and widths of walks, roads, carriageways, lanes, sidewalks, walkways, and right-of-way widths and alignment, and the storm drainage system including the local drainage areas, catch basins, pipe and culvert locations, sizes, inverts, direction of flow, as well as all proposed approaches, base gravel subdrain locations etc.



7) Lot Grading Plan:

This plan will be drawn to a scale of 1:500 and will indicate the original contours at 0.5 m intervals (shown in screened format), proposed areas of grading, finished lot corner elevations, grades and direction of finished surface drainage flows. It shall also contain the following information.

8) Shallow Utilities Plan - Power, Gas, Telephone and Cable:

This plan will indicate the alignments of power, gas, telephone and cable, and shall be drawn to a scale of 1:500. Existing infrastructure and other relevant features shall also be shown in detail.

9) Detailed Plan/Profile drawings:

Plan/Profile drawings shall be drawn to a scale of 1:500. The profile portion shall have a 10 times vertical exaggeration.

10) Legal, Easement and Land Use Plan

This plan shall indicate proposed land uses in the project along with existing and/or proposed land use on adjacent properties.

All legal and easement information shall be shown on this plan.

Public Utility Lot (PUL) widths shall be a minimum of 4.0 m for a single service and 6.0 m for a dual service. A 1.0 m easement is required on each side of a PUL. A single service centered in a 6.0 m PUL will not require additional easements.

11) Sanitary Sewer System, Water System and Storm Sewer System Plan

This plan shall indicate the alignment and locations of mains and service connections, size of mains, grade and directions of flow, location of



appurtenances, and a Table presenting the criteria used and the hydraulic design calculations for the sanitary sewer system.

Notes shall include the sanitary sewer system, water system, sump pump discharge collections system and storm sewer system material specifications (type, size, class, standard applicable, etc.). This shall apply to service lines.

12) Street Hardware Plan

A Scale of 1:500 may be used for the plan if required for clarity.

All traffic sign locations and the sign to be installed at each location.

All surface infrastructure and other features such as hydrants, light poles, power transformers, telephone and cable boxes, supermail boxes, bus shelters or benches, manhole covers and curb cocks.

3.2.7. Detailed Plan/Profile

Generally, all underground services and surface improvement profiles are shown on the same drawing. The plan portion of the sheet shall be at the top, and the title blocks, revisions, legends, company stamps, and similar features will be placed along the bottom of the sheet.

The following information will be included on the detailed plan/profile drawings:

Requirements for Sanitary and Storm Sewer:

The following information will be shown on the profile:

- 1) Size, type, class of pipe and class of bedding.
- 2) Length and percent grades between manholes.
- 3) Invert elevations at both inlet and outlet of manholes.
- 4) Rim elevations at finished grade.



The following information will be shown on the plan:

- 1) Tie location of manholes, cleanouts, and other appurtenances to property lines.
- 2) Pipe offsets from property line.

The following additional information will also be shown on an appropriate part of the drawing:

- 1) Manholes shall be numbered.
- 2) Where the sanitary sewer or water and storm drain are to be installed in a common trench, detail a typical cross-section showing distance between pipes, class of pipe and bedding.

Requirements for Water:

- 1) Tie-in the location of hydrants and other appurtenances to the nearest property pin.
- 2) Show the offset of the main from the property line and locate the end of the main to the nearest property pin.
- 3) Indicate extent of work required in making the connection to the existing water main.
- 4) Indicate the size, type, class of pipe, bedding and Canadian Standards Association (CSA) specification number on the plan.

Requirements for Roads:

- 1) Both plan and profile must be tied to a property pin, preferably near or at 0 + 000 chainage.
- 2) Show the road width and the curb offsets measured from the property line to the curb face.



- 3) Chainages of the Beginning of Curve “BC” and End of Curve “EC” of horizontal curves will be shown together with the delta angle, radius, tangent length and arc length for each curb.
- 4) The percent grade, to two decimal places, shall be shown on the profile, together with the following information on vertical curves:
- 5) The chainage and elevations of Beginning of Vertical Curve “BVC”, End of Vertical Curve “EVC” and Point of Vertical Intersection “PVI”.
- 6) The external value, “e”;
- 7) The length of vertical curve.
- 8) The elevation and chainage of the low spot of sag curves or the high spot of crest curves.
- 9) Road profiles will show the Centerline or Lip of Gutter elevations, identifying which has been used
- 10) The profile will be shown at true centreline length and projected above the plan in as close a relationship as possible.
- 11) Locate catch basins (using road chainage) and show leads between the catch basin and manhole.
- 12) Label limits of construction.

3.2.8. Lot Grading Plan Requirements

This plan will include:

- 1) Invert and location of sewer and water services.
- 2) Proposed top-of-curb or back-of-walk elevations.
- 3) Existing and proposed contours at 0.5 m intervals.



- 4) The proposed finished lot corner elevations, the proposed finished ground grade at key locations and the direction of flow of surface drainage on the lot.
- 5) Proposed finished lot elevations on side property lines at 6.0, 12.0 and 18.0 m back from the front property line.
- 6) Proposed finished lot elevations on side property lines at 6.0 m from the rear property line.
- 7) Distances from a property pin to the proposed grade break points on property lines that divide properties.
- 8) Proposed finished lot elevations at grade break points.
- 9) Standard detailed drawings shall govern the lot grading design, and critical swales elevations will be calculated as per the types shown. Refer to Standard Drawings.
- 10) The lot grading plan will have the following note: “The surveyor shall design and stake out the house elevations and finished grades at house to meet the building code slope requirements for drainage to critical swales”.
- 11) The grading plan will identify lots with weak subsoil conditions and have a notation indicating the requirement for a geotechnical Engineer footing design.
- 12) The grading plan will identify all lots with areas of 1.0 m of fill or greater, with these lots shaded a different colour.
- 13) Direction of surface drainage and critical swale elevations on side property lines. Refer to Standard Drawing 3.1.
- 14) Bench marks used in the construction of the project.
- 15) Existing contours at a 0.5 m interval shown in a screened format.



- 16) Notes for builders drawing attention to foundation, weeping tile, and sump pump design considerations and cross-referencing the Geotechnical/Hydrogeological Report.
- 17) The direction of the overland major drainage system with heavy arrows and ponding areas and flow depths resulting from a 1:100 year storm event.
- 18) Typical three dimensional detail drawings of the lot grading types depicting the house, required slopes around the house and lot grades. Each lot should be labeled to identify the detail applicable for it.

3.2.9. Power, Gas, Telephone and Cable Utility Plan Requirements

This plan will include:

- 1) Street Light Locations.
- 2) Dimension of all Easements.
- 3) Location of pedestals, transformers, cabinets and other hardware.
- 4) Lot Numbers.
- 5) The alignments of power, gas, telephone and cablevision lines. Any surface encumbrances such as light standards, transformers and boxes must also be shown.
- 6) Road crossings require conduit for the new road construction or auguring for existing roadways.
- 7) Typical cross sections of any non-standard alignments i.e. at entrances to subdivisions, around cul-de-sacs, etc.
- 8) Utility company approval of alignments shown on the plan must accompany the submission or be contained on the detailed engineering drawings.



- 9) Gas pipes shall have a minimum bury of 0.8 m. Primary cables shall be buried 1.2 m. Secondary power cables and service drops shall be buried 1.2 m.

3.3. Record Drawings

3.3.1. Scope

This procedure pertains to the record drawings of storm and sanitary sewers, watermains, roads, curbs, sidewalks, culverts and other miscellaneous permanent structures.

3.3.2. General

The record drawings shall be affixed with the stamp and seal of a Professional Engineer who, by signing, is certifying the information to be accurate and correct.

The record drawings will clearly show the locations of all services, curb cocks, valves, hydrants and manholes, using right angle measurement from survey pins.

Red line record drawings are to be submitted for review, indicating changes.

The record drawings are to be submitted to the Director of Public Works on high quality Mylar sepia sheets, within three weeks of the installations, along with one complete set of prints.

The record drawings referred to in this section will also be submitted to the Director of Public Works in digital format, as per the following requirements:

- 1) Must be compatible with the County version of AutoCAD.
- 2) Accompanied by a layer list and description.
- 3) Will conform to layering and symbol standards as established by the County or their consultant.
- 4) Be submitted on CD ROM.



On record drawings submitted to the County, the following information will be included on each drawing:

- 1) Date of completion.
- 2) Name of the contractor.
- 3) Date on which record details were added.

3.3.3. Storm and Sanitary Sewer

The following information will be included for storm and sanitary sewer systems:

- 1) Size, pipe material, pipe class, bedding and location of mains.
- 2) Location of manholes, cleanouts, and other appurtenances.
- 3) Grades, lengths, inverts of mains and rim elevation.
- 4) Profile of pipe top and bottom.
- 5) Corrected flow calculations.

3.3.4. Water

The following information will be included for water systems:

- 1) Size, type and location of pipe.
- 2) Location of valves, tees, hydrants and other appurtenances.
- 3) Profile of pipe top and invert.

3.3.5. Road, Curb, Sidewalks

The following information will be included for roads, curbs, and sidewalk:

- 1) Location of curbs, sidewalks and elevations of lip-of-gutter.
- 2) Lip-of gutter for each curb.



- 3) End of curb, sidewalks and pavement.
- 4) Type of road structure on overall road plan and each plan profile.
- 5) A typical cross-section referencing the above and representing all conditions.

3.3.6. Water, Sanitary, and Storm Service Connections

A table on each plan/profile drawing will be prepared giving the following information with respect to service connections:

- 1) Lot number.
- 2) Distance of service saddle from the downstream manholes.
- 3) Invert elevation at the end of sanitary and storm service.

The service connection provided to each lot will be shown on the plan and the location triangulated to the property lot corners.

The typical location of the curb stop will be identified on each plan/profile, (i.e. 0.3 m Front of Walk "F.O.W"., 2.65 m Back of Walk "B.O.W.") by means of a table chart.

3.3.7. Mechanical Systems

Where the subdivision includes mechanical systems, such as lift stations, the Developer will provide detailed drawings of the facility, as well as operation/maintenance manuals, including the make and model of all equipment, to the satisfaction of the County.

3.3.8. Building Grade Certificates

Prior to issuance of a Construction Completion Certificate for water, sanitary, and storm services, the Developer shall provide to the County the relevant Building Grade Certificate for each lot in the Development.

As outlined in the Development Agreement, Development Permits or building permits will not be released until all of the conditions outlined in the Development Agreement, Part Three – Development Permits are met.



3.3.9. Building Grade Information

The following information shall be shown on the Building Grade Certificate:

- 1) Water, sanitary, and/or storm services location and inverts at property line or easement line.
- 2) Power, telephone, and cable television service location.
- 3) Sidewalk and boulevard width.
- 4) Easements.
- 5) Lot corner surface elevations.
- 6) Landscape elevations at front of house.
- 7) Lot drainage pattern.
- 8) Streetlights, hydrants, etc.

This information shall be provided in the form as shown on the sample Building Grade Certificate shown in Standard Detail Drawing No. 3.2.

END OF SECTION