ABBOTSFORD

Engineering & Regional Utilities

DRAWING STANDARD SPECIFICATIONS

April 2022

1. INTRODUCTION

(a) The purpose of this document is to outline the minimum standards and requirements the City will accept for the submission of quality design and Record Drawings for Works and Services.

(b) Whenever Works and Services are required or proposed, the Consulting Engineer shall arrange for a pre-design meeting to review the requirements for the proposed Development to ensure understanding and conformance by the Consulting Engineer of the latest City standards, specifications and policies.

(c) Incomplete or substandard submissions will be returned to the Consulting Engineer without comment. A subsequent re-submission, which remains incomplete or substandard, may result in a meeting with the Consulting Engineer, Developer and Engineer.

(d) All submissions for design of Works and Services shall comply with the following:

(i) all applicable requirements of this document;

(ii) all applicable requirements of Development Bylaw, 2022; and

(iii) all applicable requirements of City Bylaws.

(e) The Consulting Engineer shall be responsible for the coordination of civil design works of the Development with the design of the BC Hydro, FortisBC Gas, telecommunication infrastructure and the street tree and Landscaping plans for that Development. Conflicts in the horizontal and vertical planes for all service connections and mains shall be resolved between the Consulting Engineer, the appropriate utility and the Landscaping Architect, to ensure that the civil design works shall be in compliance with the City’s Development Bylaw, standards, and specifications.

(f) The Consulting Engineer shall be responsible for the coordination of civil design works with provincial and federal environmental regulatory approvals in relation to works in or around streams.

(g) Parkland and trail land dedicated or transferred to the City to be included in the civil / works and services drawing set, showing applicable grading, servicing and constructed elements, e.g. trails.

2. SURVEY INFORMATION

(a) All surveys shall be conducted safely with minimal nuisance to traffic or the public at large. The Developer must obtain permission from any Owner before entering private property.

(b) All elevations shall be from geodetic datum (NAD 83, CSRS). Information regarding the location and elevation of existing Integrated Survey Monuments within the City may be obtained from the Engineering and Regional Utilities department or from the City's website.

(c) Originating benchmarks and integrated survey monuments shall be noted on all applicable plans.

(d) Copies of legible field notes shall be made available to the City upon request.

(e) Centrelines (or offset lines) are to be marked and referenced in the field, and all chainages shall be keyed to the legal posting.

(f) All existing items such as survey monuments, manholes, storm sewers, ditches, catch basins, top of bank, high water mark, fire hydrants, valves, PRVs, ARVs, utility poles and existing dwellings including addresses, retaining walls, fences, trees, canopy, edge of tree groups or woodland, hedges and unusual ground formations shall be noted.

(g) Where applicable, or as requested by the Engineer, cross-sections are required. The sections shall include locations and elevations of:

(i) centreline of pavement;

(ii) edge of pavement;

(iii) gutter line;

(iv) top of curb;

(v) back of Sidewalk;

(vi) edge of shoulder;

(vii) ditch invert;

(viii) top of Ditch banks;

(ix) top of banks and high water mark of Streams;

(x) property line;

(xi) rail infrastructure;

(xii) retaining walls;

(xiii) an existing ground elevation 3.0 metres inside property line and 5.0 metres beyond cut or fill slopes; and

(xiv) toe and top of bank of cut and fill slopes.

3. DRAWING SUBMISSIONS

(a) All drawings shall be prepared in accordance with the following requirements and all other applicable requirements of this document. A digital version of the standard title block, standard legend and standard construction notes are available for downloading from the City's website.

(b) All drawings submitted must adhere to the most recent version of the City of Abbotsford drawing standards template (including layers, line types, symbols and plot styles) as found on City's website.

(c) Any drawing reference to City's standard detail drawings should be stated once per sheet as appropriate.

(d) All new Works and Services are to be shown in bold lines. In the case of a phased project, new Works and Services shall be shown in bold lines, past phases shall be shown as existing infrastructure, and future phases (if shown) shall be clearly identified in different line work (bold grey) and noted as "Future Works".

(e) Specific notes pertaining to the construction of Works and Services are to be shown on the specific service drawing separate from standard notes referred in Subsection (a).

(f) Every Developer of lands to be developed shall provide base mapping illustrating the location of all Streams and Ditches to define priority drainage pathways existing within or immediately adjacent to the development lands.

(g) Baselines and chainages are to be referenced to at least one legal property pin on each sheet.

(h) Offsets are to be shown to both sides of the Highway or Statutory Right of Way or to one side with the Highway or Statutory Right of Way width noted.

(i) All drawings, except for the street lighting plan and the street tree and Boulevard planting plan(s), shall be signed and sealed by the Consulting Engineer responsible for the design and construction supervision of the Works and Services.

(j) All Landscaping plans including street tree and boulevard planting plans shall be sealed and signed by the Consulting Landscape Architect.

(k) Street lighting and traffic signal plans shall be signed and sealed by a Consulting Engineer responsible for the design of the Street Lighting and Traffic Signal Works and Services.

4. FRANCHISE UTILITY DRAWINGS

(a) Submission of franchise utility drawings associated to any Development or Subdivision shall be submitted by the Consulting Engineer to the City as one complete package including proposed hydro, telecommunication, cable, and gas drawings. This package shall be accompanied by a cover-letter signed and sealed by the Consulting Engineer, for each utility, confirming the following:

Re: Utility: (name of Utility)
Design Drawing #: xxxxx-xxxx-xxxx (inclusive of sheets 1 to x)
City File No.: *(file number, i.e. PRJ22-100)*
Project Location: *(civic address, i.e. 1234 Trethewey Street)*

I, (*insert Professional Engineer's name*), of (*insert name of Engineering Firm*), confirm the attached (*insert utility company or other agency; ex. BC Hydro, Telus, Fortis, Shaw, etc.*) design drawing(s) numbered (*insert drawing reference numbers*) for the proposed development at the above referenced location, have been reviewed for compliance with Municipal Standards. I confirm that the design reflected in the attached drawing(s) is in harmony with the civil design and that there are no conflicts with existing and proposed utilities and services.

Please review and, if acceptable, forward a copy of the accepted plans to our office in digital form for our forward to the appropriate utility agency or designer. If the design is not acceptable, please return with your comments to our office for further amendments. Should site conditions require modifications to accepted design drawings, we will contact the Development Engineering division prior to construction.

Please contact our office at (insert telephone number and email address of Engineering Firm) if you have any questions or concerns.

5. PLAN INFORMATION

Typically, all drawings should be oriented to view northward or westward with chainages increasing from left to right and from bottom to top with North at the top or right side of the drawing. Information on plans shall include:

(a) the municipal project “SUB” number and reference file number(s), noted in the lower right-hand corner of all drawings;

(b) the legal layout of roads and properties;

(c) the legal descriptions of all properties included in the Development;

(d) dimensions to the nearest 0.01 metres;

(e) existing house numbers of Parcels adjacent to the proposed Works and Services;

(f) all existing and proposed registered Statutory Right of Way and easements;

(g) Location and drainage direction of Streams and Ditches including top of bank and high water mark; and

6. ENGINEERING DESIGN DRAWINGS

Any proposed Development shall include a complete set of engineering design drawings identifying the proposed Works & Services in the following sequence:

(a) cover sheet – noting:

(i) the Consulting Engineer’s name, address, phone and fax numbers;

(ii) Developer’s name address, phone and fax numbers, including contact name;

(iii) surveyor’s name, address, phone and fax numbers;

(iv) the legal description and address of the lands involved;

(v) indicate if the drawing set is for On-site, Off-site or both;

(vi) a location plan insert approximately 100 mm square and at 1:4000 scale showing all proposed roads and proposed Subdivision layouts in relation to surrounding lands;

(vii) a drawing index (for smaller projects, general notes may be included on the cover sheet, otherwise general notes shall be on a separated sheet or on the appropriate utility sheet); and

(viii) benchmark details.

(b) Key Plan – at a 1:1000 or 1:500 scale – noting:

(i) all proposed Works and Services including service connections, appurtenances such as hydrants, valves, manholes, catch basins, streetlights, street trees, driveways to each Parcel and post boxes complete with all offsets, locations and dimensions;

(ii) Streamside protection and enhancement areas, and other environmentally sensitive areas;

(iii) if more than one sheet is required, note the westerly or southerly portion first and identify as Key Plan “A” with additional plans noted as “B” and “C”, etc.; and

(iv) the Development site shall be outlined with a bold line. City infrastructure, including all works within a Statutory Right of Way and other public land such as parks and trail land, must be identified separately from private infrastructure. Clarity of ownership is important.

(c) Rainwater Management Plan at 1:1000 scale – noting:

(i) the full catchment area to the nearest adequate downstream connection point for the site to be developed;

(ii) the post-Development contour lines at maximum 1.0 metres intervals. These contour lines should match to the pre-Development contour lines at the Development boundary or as designed by the Consulting Engineer. Existing topographic information shall extend a minimum 30.0 metres outside the Development boundary;

(iii) a directional arrow on each Parcel indicating the prevailing post-Development slope of the land;

(iv) the proposed minor (10-year return) Drainage System complete with inlet and outlet structures, catch basins and connection(s) to existing, adequate Drainage Systems;

(v) the proposed major (100-year return) post-Development flood route(s) and Drainage System, complete with connections to existing, adequate Drainage Systems;

(vi) the storm detention facility location, size, volume, area of catchment, flow control structure, design water level, overflow spillway, release rate and head on orifice;

(vii) rain water infiltration facility location, catchment area and dimensions, and the calculation table;

(viii) onsite source control measures including bio-swales and rain gardens, absorbent soils, and other approved runoff treatment facilities;

(ix) a legend noting all items shown on the RWMP;

(x) a design table, per ES-D-5 noting information for each segment of proposed main including the catchment area (in hectares), run-off coefficients, time of concentration, rainfall intensity, major and minor flow volume, pipe size, slope and capacity both existing and proposed;

(xi) streams and ditches, including surveyed high water mark and top of bank, as well as all lands not proposed for development, including Streamside Protection and Enhancement Areas, environmentally sensitive areas, or steep slopes; and

(xii) all trees proposed for retention, including the tree protection zone as identified by a Certified Arborist.

(d) Road Works – profile drawings and shall be at a scale of 1:500 horizontal and 1:50 vertical noting:

(i) existing and proposed elevations and locations of:

A. the centre line and grade of proposed and existing Roadways;

B. proposed and existing curbs and gutters and Sidewalks;

C. all curves at appropriate arc locations; and

D. all existing and proposed catch basins including rim elevations;

(ii) BC, EC, arc length and “k” value design details of all vertical and horizontal curves;

(iii) the design speed of the roadway on each plan;

(iv) elevations along the gutterline and along curb returns;

(v) all trees proposed for retention, including the tree protection zone as identified by a Certified Arborist;

(vi) all existing utilities' (water, sanitary and storm) displayed with appropriate line weights and types, including location and size;

(vii) streams and ditches, including surveyed high water mark and top of bank, as well as all lands not proposed for development, including Streamside Protection and Enhancement Areas, environmentally sensitive areas, or steep slopes; and

(viii) all pavement restoration works shall be shown with 10% shading. All pavement restoration works shall be consistent with detail CS-R-16.

(ix) Typical Road Cross Section complete with labels and dimensions of all cross-sectional elements and road structure.

(e) Water Mains – shall be at a scale of 1:500 horizontal and 1:50 vertical noting:

(i) all water mains and appurtenances including valves, hydrants, bends, tees, tie-in locations, test points, blow offs, air valves etc. including their coordinates (Northing and Easting);

(ii) symbols on profile denoting service location, connection location, water meter and meter box location and elevations at property line;

(iii) the full pipe shall be shown on the profile;

(iv) all existing, future and proposed utilities' (water, sanitary and storm) displayed with appropriate line weights and types, including location and size;

(v) all water main crossover points with sewers and other utilities, including clearance and protection details;

(vi) the size, class, type, length and slope of each continuous water main pipe section;

(f) Storm and Sanitary Sewers – may be on the same plan/profile drawings and shall be at a scale of 1:500 horizontal and 1:50 vertical noting:

(i) all sewer mains and appurtenances including cleanouts, inspection chambers, manholes, catch basins, etc.;

(ii) symbols on profile denoting the service connection location and elevations at the property line;

(iii) the Major Drainage System hydraulic grade lines (HGL) on the profile;

(iv) the full pipe shall be shown on the profile;

(v) rim elevations of all manholes catch basins and cleanouts;

(vi) the size, class, type, length and slope of each continuous pipe section;

(vii) chainages and invert of each appurtenance shall be shown on profile;

(viii) all existing, future and proposed water mains and appurtenances displayed with appropriate line weights and types, including location and size;

(ix) all crossover points with other sewers, water mains and utilities including clearance and protection details;

(x) storm detention and infiltration system, information calculations and construction details, if not provided on the Rainwater Management Plan;

(xi) streams and ditches, including surveyed high water mark and top of bank, as well as all lands not proposed for development, including Streamside Protection and Enhancement Areas, environmentally sensitive areas, or steep slopes;

(xii) at least one (1) property line shall be located by chainage relating to the mains on each sheet; and

(xiii) all trees proposed for retention, including the tree protection zone as identified by a Certified Arborist.

(g) Road Cross-Sections – the scale shall be at 1:100 horizontal and 1:50 vertical. Plans shall include:

(i) cross-sections every 20.0 metres and shall show proposed construction over existing conditions to 10.0 metres beyond property line of the Statutory Right of Way for Highway purposes;

(ii) if applicable, show proposed surface elevations meeting existing ground or the proposed site grading at property line; and

(iii) additional sections may be required or requested where large cuts or fills are involved.

(h) Ornamental Street Lighting Plan - shall include :

(i) sign and seal of a professional electrical engineer registered with EGBC. Design drawings shall be submitted for approval along with a PDF copy of signed and sealed computer lighting and voltage drop calculations;

(ii) general notes and legend;

(iii) plan drawings at a scale of 1:500 showing pole locations, conduit and service equipment. For beautification type projects which have more electrical features such as pedestrian scale lighting and pole/tree receptacles, plan drawings at a scale of 1:250 may be required. Poles and service equipment shall be located by offset and dimension from closest property lines. Conduit shall be located by offset from edge of pavement or curb and gutter;

(iv) all civil drawing information such as curbs, sidewalks, property lines, as well as all physical features that may impact the lighting design;

(v) sufficient street name and land or block location information to identify particular sections of road referenced in the lighting design summaries;

(vi) mounting height and type of lamp standard including finishing (i.e.: galvanized, galvanized/powder-coated);

(vii) list of specific products such as luminaires (including any approved alternate luminaires), by manufacturer, make and model number;

(viii) completed lighting Design Criteria Table (see example Table 2.1 below) for each road, walkway, intersection or roundabout;

(ix) location of proposed service base and hydro service box;

(x) off-set and chainages of each lamp standard;

(xi) pole elevations. Title and scale information (e.g. ELEVATIONS 1:75) shall be added under each set of elevations;

(xii) location and height of banner brackets, receptacles, and hanging basket brackets;

(xiii) location of all underground and overhead utilities; and

(xiv) dropped service location from hydro pole.

TABLE 2.1: Lighting Design Criteria Table Example

LIGHTING DESIGN CRITERIA TABLE				
ITEM	**REQUIRED VALUES**	**CALCULATED VALUES**	**REQUIRED VALUES**	**CALCULATED VALUES**
STREET NAME(S)	McLean Ave		Intersection of McLean Ave and Caspers St	
LAND USE CLASSIFICATION	Residential		Residential	
ROADWAY CLASSIFICATION & WIDTH	8.6m Local		8.6m Local/12.2m Collector	
PEDESTRIAN ACTIVITY LEVEL	Low		Medium	
LUMINAIRE DESCRIPTION, MANUFACTURER & MODEL	LED Roadway Lighting Ltd. SAT-48S		LED Roadway Lighting Ltd. SAT-48S/SAT-96M	
PHOTOMETRIC FILE NUMBER	SAT-48S-350mA-T2.ies		SAT-48S-350mA-T2.ies SAT-48S-450mA-T2.ies	
LUMINAIRE WATTAGE, LIGHT SOURCE and COLOUR TEMPERATURE	55W, LED, 3000k		55W/143W, LED, 3000k	
LIGHT LOSS FACTOR	0.72		0.72	
LUMINAIRE DISTRIBUTION CLASSIFICATION AND BUG RATING	Type II, B1-U1-G1		Type II, B1-U1-G1 Type III, B2-U0-G2	
POLE HEIGHT (m)	7.5m		7.5m/9.0m	
POLE ARRANGEMENT	one sided		n/a	
POLE SPACING (WORST CASE)	48m		n/a	
INTERSECTION ILLUMINANCE LEVEL (Eavg)	n/a	n/a	16 Lux	18 Lux
INTERSECTION UNIFORMITY RATIO (Eavg:Emin)	n/a	n/a	4.0:1	3.8:1
ROADWAY LUMINANCE LEVEL (Lavg)	0.3 cd/m2	0.4 cd/m2	n/a	n/a
ROADWAY UNIFORMITY RATIO (Lavg:Lmin)	6.0:1	5.1:1	n/a	n/a
ROADWAY UNIFORMITY RATIO (Lmax:Lmin)	10.0:1	9.1:1	n/a	n/a
ROADWAY VEILING LUMINANCE RATIO (Lvmax:Lavg)	0.4:1	0.37:1	n/a	n/a
SIDEWALK HORIZONTAL ILLUMINANCE LEVEL (Eavg)	3 Lux	4 Lux	n/a	n/a

(i) Lot Grading Plan at 1:1000 scale – noting:

(i) pre-development contours at maximum 1m intervals extending a minimum 20m beyond the Development site;

(ii) existing elevations at all property line(s) (uncircled);

(iii) proposed elevations at all property line(s) (circled);

(iv) fill over 0.45m (shaded);

(v) fill over 1m (hatched);

(vi) surface flow direction on each lot, noting a minimum 2% grade;

(vii) overland flow arrows from neighbouring lots;

(viii) minimum Building Elevation (MBE) for each lot and include each MBE definition;

(ix) garage pad elevation and proposed driveway grade;

(x) where applicable, show Streamside Protection and Enhancement Areas, other environmentally sensitive areas, and the tree protection zone of retained trees;

(xi) retaining walls, fencing; and

(xii) retained trees.

(j) Erosion and Sediment Control Plans

ESC plans shall include all pertinent information in accordance with City's ESC Bylaw and other provincial legislation. Key components requiring consideration in preparation of the ESC plan are as follows:

(i) Phased site clearing plans;

(ii) Construction phase water management plans;

(iii) Access/egress controls;

(iv) Vehicle use restrictions;

(v) Disturbed surface protection measures;

(vi) Work surface augmentations;

(vii) Wet weather operating procedures; and

(viii) Detention and runoff treatment.

(k) Construction Details

(i) All construction details that are not covered or specifically detailed in the MMCD Specifications or Development Bylaw, 2022 shall be provided on the drawings pertinent to the utility or on a Construction Details sheet. Where there is a City standard or detailed drawing, a reference to the standard is acceptable but must be provided once per drawing sheet.

(ii) Domestic water meter sizing calculations per AWWA M22.

(l) Tree Survey Plan to include:

(i) the City's Tree Protection Bylaw, Development Permit or Preliminary Layout Approval Letter will specify requirements for identification and protection of trees. All submissions must support the tree retention plans identified in the Development Permit or Preliminary Layout Approval;

(ii) location of bylaw sized trees located within 1 tree length of proposed development boundaries (including property edges, clearing boundaries, and Streamside Protection and Enhancement Area). The trees must be identified as retained or removed, in accordance with the tree retention plan;

(iii) delineation of prescribed tree protection zone for edge trees as specified by a consulting arborist or forester; and

(iv) where applicable, show Streamside Protection Enhancement Areas, other environmentally sensitive areas, and the tree protection zone of retained trees.

(m) Pavement Marking and Street and Signage Plan – shall be at a scale of 1:500, or 1:250 (only for signalized intersections), or 1:1000 noting:

(i) pavement markings including: arrows, edge of pavement lines, median and traffic movement islands, centre line, Lane markings and symbols;

(ii) street and traffic signs including: directional arrows, advance warning signs and checkerboards, street name signs and traffic advisory signs; and

(iii) signs to reference TAC Canada MUTCD. Provide sign ID's along with a legend showing sign images.

(n) Landscape Plan – shall be at a scale of 1:250 noting:

(i) location, offset, spacing, type etc. of all street trees;

(ii) existing and proposed roads, property lines, and right-of-ways labeled with their appropriate identifier;

(iii) locations of service connections and driveway(s) to each Parcel;

(iv) locations of all existing and proposed underground and overhead structures including utilities;

(v) location of all street furniture such as hydrants, streetlights, signs, post boxes and any other appurtenances affecting the placement and integrity of the proposed street trees;

(vi) locations of all existing features to be retained including trees, vegetation, Streamside Protection and Enhancement Areas, and other environmentally sensitive areas;

(vii) locations and heights of retaining walls and fencing – there must be fencing between private and public property where there is a park or trail.

(viii) a detailed planting plan and plant list including botanical name, common name, planting size, spacing, and quantity;

(ix) swales and ditches with flow direction noted; and

(x) seal and signature of a Consulting Landscape Architect.

(o) Other Information

The following additional information shall be noted on pertinent drawings:

(i) all existing and proposed infrastructure including franchise utilities and private services complete with size, type of material, inverts, off-sets and notes detailing connection and tie-ins, by whom, how and at whose expense;

(ii) all existing structures, including houses, sheds, fences, poles, pole anchors, overhead or underground encroachments, wells, septic tanks and septic fields, with notations indicating their fate (i.e., to be demolished, removed, filled, etc.);

(iii) the Consulting Engineer or Consulting Landscape Architect shall consult with outside utility agencies where applicable to ensure that the design, construction and installation of the franchise utility infrastructure are possible without interference with proposed Works and Services. Further, the consulting Engineer must confirm that the installation and maintenance of the franchise utilities do not impact any vegetation within Streamside

Protection Areas or environmentally sensitive areas, or retained trees. All revisions to either Works and Services or franchise utility designs shall be coordinated by the Consulting Engineer. Any further dedications, Statutory Right of Ways, easements, etc. that are required to provide appropriate franchise utility designs are the responsibility of the Developer; and

(iv) the Consulting Landscape Architect shall confirm location of all existing utilities and the adequacy of existing and proposed Statutory Right of Way, prior to final submission of landscape design drawings.

(v) all critical utility crossings shall be pre-located prior in conjunction with field survey and noted as such on the respective drawings.

7. DESIGN SUBMISSION SEQUENCE

(a) The Consulting Engineer shall arrange a pre-design meeting with the City at which preliminary information and concept plans will be reviewed for initial comment.

(b) The first drawing submission of the Consulting Engineer(s) including the electrical drawings for street lighting and traffic signals shall be in the form of an unrestricted PDF electronic file consisting of the proposed Works and Services sheets in accordance with this document. Drawings for street lighting and traffic signals shall be submitted in print form that are signed and sealed by the Consulting Engineer.

(c) Design drawings shall be accompanied by:

(i) all applicable calculations for the design of the proposed water mains, storm sewers including detention/retention/infiltration facilities and sanitary sewers in PDF form;

(ii) PDF copy of a detailed geotechnical report;

(iii) PDF copy of franchise utility final design drawings previously reviewed by the Consulting Engineer; and

(iv) PDF copy of the Landscaping plans.

(d) Subsequent design submissions shall consist of:

(i) a complete construction Class A cost estimate in the form as stated in Development Bylaw, 2022 Section 11.3 (b) (this may accompany first submission) sealed by the Consulting Engineer;

(ii) an unrestricted PDF electronic file of the Works and Services plus signed and sealed prints of the electrical drawings for street lighting and traffic signals;

(iii) all previous submission “red lined” marked sets with all changes highlighted in yellow (any “red lined” marks not revised shall be accompanied by a memorandum outlining the reasons why the change was not made);

(iv) any revisions or changes by the Consulting Engineer not part of the earlier submissions shall be clouded with revision clouds on the drawings and identified and described in a memorandum explaining the changes (revision clouds from previous submissions are to be removed); and

(v) all items “red lined” by the City shall be addressed by the Consulting Engineer. Failure to do so will result in submissions being returned without review.

(e) The final submission shall consist of:

(i) a new cost estimate marked “FINAL SUBMISSION ESTIMATE”;

(ii) five (5) complete sets of paper plans of the proposed Works and Services, signed and sealed by the Consulting Engineer and Consulting Landscape Architect as required;

(iii) signed “Waterworks Construction Permit” from the Fraser Health Authority;

(iv) one (1) set of drawing files in PDF plotted from AutoCAD with electronic seals and certification ; and

(v) one (1) set of drawing files in DWG or DXF format on Compact Disk (CD) or alternative storage media approved by the City.

7. RECORD DRAWING INFORMATION

(a) Service Record Cards and Hydrant Record Cards are considered part of the “Record Drawing” submission, and shall be submitted with all record drawing submissions.

(b) The Record Drawings shall be the original AutoCAD design drawings, amended to reflect the actual constructed infrastructure and shall show all Works and Services performed during construction, including but not limited to,

(i) all existing infrastructure modified, removed, or abandoned in place;

(ii) all construction notes including infrastructure removed, replaced, or modified;

(iii) all surveyed locations of fencing adjacent to Streamside Protection and Enhancement Areas;

(iv) on environmental drawings only: if any streams or ditches were modified during the development, include the final surveyed location of the high water mark;

(iv) all new infrastructure reflecting final construction based on field survey data and inspection reports; and

(v) complete drawing revision history in revision block.

(c) The following procedure shall be followed in the submission of Record Drawings:

(i) To produce Record Drawings of the constructed Works and Services, the Consulting Engineer shall take professional responsibility for the supervision and direction of the construction survey or retain the services of a Surveyor;

(ii) the Consulting Engineer shall submit a copy of surveyed ‘redlines’ when requested by the Engineer, an unrestricted PDF electronic file of the Works and Services drawings, showing all works as constructed (except for the road cross-section sheet(s)), one (1) set of photocopied Service Record Cards and one (1) set of photocopied Hydrant Record Cards for review;

(iii) the Record Drawings submission will be returned to the Consulting Engineer for revisions, if necessary. The Consulting Engineer shall re-submit the PDF electronic file for review and acceptance;

(iv) Record Drawings shall be presented as follows:

A. the key plan showing the as-constructed offsets and locations of all Works and Services including service connections;

B. the road works, water main, sanitary sewer and storm sewer plans showing elevations, inverts and off-sets as constructed. Profiles of the utilities shall state pipe materials, bedding and backfill used with chainages referenced to at least one legal posted Parcel line on each sheet;

C. the Rainwater Management Plans as constructed;

D. the lot grading plans showing surveyed as-constructed ground elevations at all Parcel corners, building envelope corners, back of curb or Sidewalk, and any changes in grade across the Parcel including top-of-wall (TOW) and bottom-of-wall (BOW) elevations,

and geotechnical constraints and details. The MBE, GPE, lawn basins, manholes and swales and any other feature that may affect the construction of a building on the Parcel shall also be identified. Uniform grades between Parcel corners will be assumed to be within a tolerance of ±150 mm. In addition, the lot grading Record Drawings shall also show the horizontal location of all surface features between the front (or side lot line when a corner) and the back of curb or sidewalk, Such surface features shall include but not necessary be limited to streetlights, hydrants, franchise utility boxes and utility poles;

E. the streetlight plans showing make, model, type of luminaire unit, illumination levels achieved with the Record Drawings light spacing, locations of service bases, photocells and hydro service entrances as constructed;

F. any plans and details for PRV stations, pump stations, or other facilities complete with any operating manuals, Letters of Assurance, Schedule B, and C-B for structural, electrical, mechanical and geotechnical aspects of the construction etc.;

G. any plans for parks or trail land (not referring to completed parks) but any work the developer has committed to on public park or trail land e.g. grading, servicing, trail building and fencing;

H. a final geotechnical report addressing all recommendations and details of the preliminary report, confirming construction techniques, applications and details including placement and compaction of fill materials in excess of 1.5 metres, stability of cut and fill slopes and embankments equal to or steeper than 2V:1H; and

I. a geotechnical report including Letters of Assurance, Schedule B, and C-B for structural and/or geotechnical confirmation of all retaining walls in excess of 1.2 metres in height; and

(v) when the City is satisfied with the Record Drawing submission, the Consulting Engineer shall submit the following:

A. one (1) PDF signed and sealed drawing package identified in bold letters with the words “Record Drawings” in the revision block complete with date;

B. a note on the drawings with the following certification:

i. "I certify that these record drawings represent the Works and Services that have been supplied, constructed and installed in substantial conformance with the intent of the designs as accepted by the Engineer dated _____."; and

ii. the seal and signature on the drawings shall be that of the Consulting Engineer who was personally responsible for the design and inspections. The City will return one (1) set to the Consulting Engineer upon acceptance noting acceptance of record drawings;

iii. In compliance with Engineers and Geoscientists BC Use of Seal the following declaration is to also be included on the drawings:

"The seal and signature of the undersigned on this drawing certifies that the design information contained in these drawings accurately reflects the original design and the material design changes made during construction that were brought to the undersigned's attention. These drawings are intended to incorporate addenda, change orders, and other material design changes, but not necessarily all site instructions.

The undersigned does not warrant or guarantee, nor accept any responsibility for the accuracy or completeness of the as-constructed information supplied by others contained in these drawings, but does, by sealing and signing, certify that the as-constructed information, if accurate and complete, provides an as-constructed system which substantially complies in all material respects with the original design intent."

C. two (2) complete set of Service Record Cards for each Parcel submitted on card stock as well as digital versions in PDF and DWG format;

D. two (2) copies of Hydrant Record Cards for each hydrant as well as digital versions in PDF and DWG format, complete with hydrant numbers as assigned by the City;

E. one (1) set of digital drawings in DWG format on USB drive, or other electronic media approved by the City;

F. all digital data submitted as Record Drawing information must match the signed and sealed hard copy “Record Drawing” submission; and

G. upon acceptance by the City, the Engineer may authorize a Security Deposit reduction to reflect the acceptance of the record drawings, Service Record Cards, Hydrant Record Cards, and digital data.

(d) All survey for Record Drawings shall be supervised by the Consulting Engineer or performed by a Surveyor retained by the Consulting Engineer.

(i) To produce record drawings of the constructed Works and Services, including lot grading, the Consulting Engineer shall take professional responsibility for the supervision and direction of the survey unless the Consulting Engineer retains a Surveyor for this purpose.

(ii) the Consulting Engineer shall submit a copy of the of the survey in an unrestricted PDF electronic file of the Works and Services, showing all works as constructed (except for the road cross-section sheet(s), one (1) set of photocopied Service Record Cards and one (1) set of photocopied Hydrant Record Cards for review;