The Corporation of the City Of New Westminster

Engineering Department

Drafting Standards

May 2006
V1.0

CORPORATION OF THE CITY OF NEW WESTMINSTER

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ENGINEERING DEPARTMENT

Introduction

These standards are prepared for developers and consultants to assist in the preparation of construction and as-built drawings required by the City of New Westminster.

Adherence to these standards will save time in the preparation of drawings and expedite their review and approvals. Since all services will become part of the City's Geographic Information System (GIS), the location of every element must be defined and plotted without having to 'guess' and approximate the location.

These standards will be updated from time to time. Any suggested improvements or clarifications will be appreciated. Please forward suggestions to the attention of Nicole Jung, GIS Technologist Engineering Department, City of New Westminster

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A CD rom containing a New Westminster prototype drawing complete with settings, colours, and layers is enclosed.

Also included on the CD is

- New Westminster A-1 size border including title block
- Symbol library
- Linetype folder
- Detail drawings

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A. General Standards

All as constructed drawings and as-built drawings will be designed in model space and plotted in paper space using layouts. Each drawing layout is to include and limited to one drawing sheet.

The drawing sheet will include single or multiple view ports depending on the amount of design detail to be shown.

1. Survey Requirements

1. All surveys shall be integrated with the control monuments in the vicinity of the area under survey. Survey ties must be made to no fewer than two (2) ISA #49 control monuments. The control monuments used must be shown on the plan by the appropriate symbol, together with the number or designation of each control monument. The plan must show all ties made to control monuments, all intermediary stations, and the measurements (distance and bearing) between them.

2. All surveys shall be located within the geographic coordinate system used by the City of New Westminster (UTM NAD 83 zone 10) in accordance with the City of New Westminster GIS Standards Document.

3. Surveys of all surface work (roads, buildings, hydrants, etc.) shall be done in accordance with the following standards and must be shown on the drawings. Symbols not included in the these standards can be derived from MMCD standards shall be explained or accompanied by a data dictionary that explains all the names of layers and all the graphic symbols used.

2. Basic Requirements for Legal Surveys:

1. All legal surveys must be certified by a registered British Columbia Land Surveyor.

2. All legal surveys must comply with the General Survey Instructions to British Columbia Land Surveyors issued by the Office of the Surveyor General.

3. All legal surveys submitted for approval to the City of New Westminster's Subdivision Approving Officer must be submitted on paper and in CAD/DXF format allowing a simple "cut-and-paste" operation that correctly positions, scales and rotates the new legal parcel drawing elements within the City of New Westminster's UTM, NAD83 design plane.

3. Drafting Standards

Size:	A1 (594x841mm)
Material:	24lb plotter bond paper
Format:	½ plan and ½ profile (plan at top of sheet)
Profile:	Minimum 1:50 vertical by 1:500 horizontal grid unless otherwise specified by authorized person
Minimum lettering:	Height 2.0mm and 1.5mm for field pickup
Title block:	A title block is to be filled in and located in the lower right hand corner of each sheet

4. "As-constructed" Drawing Submission

a) Check copy – 1 set of paper prints
A check copy (paper) is required before "as-constructed" drawings are submitted. These prints will be checked for completeness and compliance with these standards. Once the set of drawings is checked they will be returned for correction.
Once any deficiencies are corrected, the final prints are to be submitted

b) Final set of drawings are to include
- Vellum as-built
- Corrected set of paper prints sealed by the engineer of record
- Original marked up set of prints
- Second set of paper prints sealed
- Set of purged digital drawings submitted on CD in AutoCAD Map 2004 or newer format

The as-built will also show:
- The date of completion of the construction on the drawings
- As-constructed in the revision box
- Service connection record (ie long and short)

Please note that
a) All drawings with incomplete , non-standard or confusing information will be returned for clarification and/or correction
b) All as-constructed drawings will remain the property of the City of new Westminster after their acceptance.

5. *"GIS Ready" Drawing Submission*

1) Unless the requirements are reduced or waived by the Authorized Person depending on his/her consideration of the extent, complexity and nature of the new infrastructure servicing provided for the subdivision or development, the engineer shall submit "GIS-ready" digital plans in accordance with the requirements herein.

2) A "GIS-ready" digital plan drawing (AutoCAD MAP) depicting new infrastructure construction shall conform to drawing symbol, block and layering requirements as shown in Appendix A and B of this document

3) The digital data requirement for the "GIS-ready" Site Plan are as follows:

(a) Format: spatial data shall be stored in AutoCAD Map 2004 or Shape file format;
(b) Metadata: data shall have metadata attached including author, date of creation and accuracy;
(c) Projection and datum: all data shall be in UTM NAD 83 zone 10. The coordinate units shall be in meters and stored without offsets;
(d) Precision: Data shall be created in double precisions coordinates;
(e) Topology:

I. All data shall be topologically clean and correct;
II. All polygon boundaries shall meet exactly and be closed;
III. Arcs shall not contain pseudo-nodes;

(f) Data registration: Existing features should be copied, rather than digitized to form features where applicable.

B. Drawing Preparation – general

1. *General Notes*

(a) **"Proposed"** denotes those services to be installed on the project
"Existing" denotes those services that, at the time the project is submitted, are in the ground

"New" denotes those proposed services installed as part of the project when submitted as "As-Built" drawings.

(b) Key plans are to show "as built" information for those services not shown on another drawing when submitted with the "as-built" drawings.

(c) Name, address and phone number of the consultant and client are to be on all drawings. All designs and requirements as per ***City of New Westminster Design Criteria*** and ***Supplementary Specifications and Detail Drawings***.

(d) On projects in existing roads, statutory rights-of-ways and easements, the plan view will show all the following existing services including offset dimensions and sizes.

- water, appurtenances, valves and connections
- sanitary sewers, inspection chambers, manholes and connections
- storm sewers, inspection chambers, manholes and connections
- catchbasins
- ditches and existing drains
- driveway culverts
- utility poles
- gas lines
- underground cables, eg. Electrical, telephone, cable and fibre optics, MOT, remote control cable
- buildings
- property pins
- trees

(f) Each new service shall be highlighted and all other works on the project shall be shown. Road drawings need only show surface features (eg. Manholes, valves, etc.)

(g) Notes pertaining to the construction of a service are to be shown on that service drawing.

(h) All dimensions and elevations are to be in meters.

2. Chainages

(a) Chainage stations will be at 10 meter intervals (+20, +30 etc.) and measured along the centerline of road. 1+00 is to be tied to a legal pin or monument.

(b) Chainage intersections and starting points are to be related to lot corners.

(c) One property line chainage is to be placed on each plan view on each sheet on each side of the road.

3. Plan View

(a) The plan view is to be drawn at a scale of 1:500 **except traffic signal design drawings which are to be plan view 1:200 and profile view 1:50.** The profile is to be drawn to scales: horizontal 1:500, vertical 1:50. All symbols to be used on the drawings to be as per City of New Westminster symbol block libraries.

(b) All offsets of series, existing, proposed, and new will be indicated to the nearest 0.1m and referenced to and along property lines.

(c) Benchmarks (including TBM's) are to be noted in the legend with location and elevation. Survey monuments are to be shown on the plan view.

(d) The plan view will show the legal layout of roads and properties showing lot numbers and addresses. Also show all registered statutory rights-of-way.

(e) The names of streets are to be indicated outside of the road boundaries. Road widths are to be annotated. No temporary street names (eg. A, B or C) will be accepted.

(f) All work done must be shown (eg. removal of clean out or replacement of a clean out by a manhole, removal of existing blowdowns, lines abandoned, etc.) and clearly noted on the appropriate drawing.

(g) An offset from lot corners must be shown for all service connections (the note "centerline of lot" or "typical" is not acceptable). If the connection is not perpendicular to the main, the location of each bend is to be shown.

(h) The invert and depth (where applicable) are to be shown for all service connections and are to be "boxed" in. Where there are existing connections, the field-measured inverts are to be shown. Information obtained from an "as built" drawing must be clearly noted, as such.

(i) The location of manholes as shown on the drawings are to be the location of the intersection of the pipes within the manhole, not the location of the lid. When there is a major difference, a note stating the offset of the manhole lid should be added to the drawing.
Each change of direction (pipe deflections) must be noted with chainages; or noted as follows:
- Pipe pulled from sta.____to sta.____.
- BC at sta. ——
- EC at sta.____.
- Bend at sta.____.

(j) Proposed works are to be drafted in bold lines as specified in the standards

(k) On curves, clearly locate all fitting with chainages and offsets.

(l) All drawings will include a **true north arrow**

4. Profile

(a) The profile view will show:
- Chainage, inverts and profile along the centerline of pipe.
- elevations of proposed and existing works.
- proposed and existing service connections and their respective invert elevations.
- services being crossed by the proposed works (and their elevations).
- all data pertaining to the design of the works.

(b) Elevations at all grade changes are to be shown with a chainage or ties to lot corners.

(c) All elevations are to be geodetic and rounded to the nearest 0.01m with the exception of Sewers where the elevations are to be round to the nearest 0.001m.

C. Drawing Preparation – Specific Services

1. Storm and Sanitary Services

(a) Connections greater than 100mm diameter shall be shown and noted on the plan with ties to lot corners.

(b) Main size and material and manhole size and material are to be shown as well as all elevations.

(c) Where a new main ties to an existing stub, the balance of the distance to the existing manhole (from the new main) is to be shown.

(d) All private and Municipal inspection chambers (either offset and chainage or two ties to property lines) to the centerline of the rim are to be shown.

(e) Type of backfill material is to be shown

(f) Storm sewer catchbasin locations (either offset and chainage or two ties to property lines) to the centerline of the rim are to be shown. Where chainage is used, the base line must be shown and referenced to legal and curve data.

(g) Profiles are required for all storm and sanitary drawings.

2. Roads

(a) A typical cross-section of the designed roads will be shown on every drawing.

(b) A table showing curve and curb return data is to be shown on the road drawings.

(c) Pavement tapers are to be dimensioned to legal with length of taper and the offset to existing pavement.

3. Water

(a) All fittings used are to be noted and tied to chainages and lot corners. Show on the 'plan' portion of the drawing. Fittings will have the description of hub, flange, etc.; eg. 150H x 150 H x 150 FL TEE.
(b) All fittings are to be shown in the profile with the elevations and chainages indicated.
(c) Water connections larger than 20mm diameter shall be annotated. Water connections 100mm diameter and larger shall be annotated complete with elevation at property line on plan view.
(d) A list of material fittings used is to be shown in a material fittings table.
(e) The location of all bend points along curves must be shown and dimensioned to legal.
(f) Profiles are required for all water drawings.
(g) Dimension detailed to the nearest 0.01m

4. Street Light Works & Traffic Communications Conduit

(a) The drawings will only include plan views. All improvements (service boxes, poles, etc.) are to be tied to property lines.
(b) Street lights are to be numbered, consecutively beginning at number 1.
(c) Note wattage of street lights, base information, height of pole, manufacturer

5. Cross Sections

In relation to road works and sidewalks, cross-sections at 20 meter intervals, may be required for the proposed works. For road works, this will involve cross-sections across at least the full width of the road allowance. The cross-section shall show property lines, ditches, edges of existing road and centerline of road. It shall indicate chainages and elevations of each break in the cross-section. The proposed road works shall be drafted in bold lines with the emphasis on the finished surface of the road. Elevations of the proposed road shall be indicated. Road measurements off set of the centerline referenced from the baseline are also to be indicated.

Cross-sections shall be drafted using scales as follows:
Horizontal 1:200 Vertical 1:20
Elevations shall be rounded off to the nearest centimeter.

6. Signalized Road Intersections

Drafting Standards
Size: A1(594 x 841mm).
Material: High grade 20lb erasable vellum or 3 mil polyester film.
Plan view: Scale 1:200 (U/G Utility inset in top right corner of sheet is 1:500)
(North is oriented to top of sheet)
Profiles: Scale 1:50.
Lettering: Minimum height of 1.5mm.
Dwg. Units: 1 drawing unit is equal to 1mm.

7. Sediment and Erosion Control Plan

- Vicinity map showing location of site in relation to the surrounding area.
- Site plan details. This should include
    - existing vegetation,
    - existing and proposed ground contours,
    - existing and proposed drainage patterns,
    - limits of clearing and grading,
    - limits of cut and fill,

    - external drainage to be addressed, and
    - locations of sediment control best management practices.
- The elevations of underground utilities, which are crossing the proposed storm sewer line shall be shown on the profile.
- A plan showing sub-catchment areas, catchment boundaries, external drainage and the drainage system.
- A plan identifying the specific land uses modeled for each development condition analyzed.

8. Storm Water Management Plan/ Lot Grading Plans

- Existing and proposed tributary areas in the catchment along with existing and ultimate land uses;
- The development area within the drainage catchment including all features such as roads, ditches, drainage control structures, storm sewers, culverts, drainage facilities, and grading;
- Pre and post development hydrologic and hydraulic calculations summarized in table form and supporting parameters (if not in report)
- Ensure consistency with all existing City Master Drainage Plans (MDP) or equivalent
- Identify major and minor system flow directions. Include surface flow path if not consistent with the major system flow path.
- Downstream conveyance capacity limitations (if not in report)
- Design details and supporting information for all proposed SWM facilities (i.e. detention ponds, onsite retention measures, water quality treatment facilities, etc) if not in report
- External drainage patterns if they impact the proposed development (if not in report)
- Show floodplain line if applicable and any mitigation measures
- Easements required
- Include lot corner elevations, elevation indicated where grade changes occur, minimum building elevation(MBE) and Flood Construction Level (FCL) shall be depicted on all lot grading plans
- Include elevations of service locations
- Include lot corner elevations of adjacent properties

Appendix A – Symbol sets

Sanitary and Combined Sewer Symbols

Insertion Layer			Block Name		Symbol	
Existing	Proposed	Description	Existing	Proposed	Existing	Proposed
E-SAN	AB-SAN	CLEAN OUT	ESCO	PSCO		
E-SAN	AB-SAN	MANHOLE	ESMH	PSMH		
E-SAN	AB-SAN	INSPECTION CHAMBER	ESIC	PSIC		
E-SAN	AB-SAN	VALVE	ESVL	PSVL		

Storm Drainage Symbols

Insertion Layer			Block name		Symbol	
Existing	Proposed	Description	Existing	Proposed	Existing	Proposed
E-STM	AB-STM	CATCHBASIN	EDCB	PDCB		
E-STM	AB-STM	CATCH BASIN ROUND	EDCBR	PDCBR		
E-STM	AB-STM	CLEAN OUT	EDCO	PDCO		
E-STM	AB-STM	DITCH	DDI			
E-STM	AB-STM	HEAD WALL	DHW			
E-STM	AB-STM	MAHOLE	EDMH	PDMH		

Water Symbols

Insertion Layer			Block Name		Symbol	
Existing	Proposed	Description	Existing	Proposed	Existing	Proposed
E-WAT	AB-WAT	VALVE	EWVL	PWVL		
E-WAT	AB-WAT	TEE	WTEE			
E-WAT	AB-WAT	CROSS	WCROSS			
E-WAT	AB-WAT	HYDRANT	EWWH	PWWH		

Symbols	Description	DWG Name	Layer
	Alummium Post	alm-post	LEGAL
	Angle Iron	angl-iron	LEGAL
	Benchmark	benchmrk	LEGAL
	Concrete post	con-post	LEGAL
	Control Monumnet - Geodetic BM integrated survey monumnet	mon	LEGAL
	indefinate elevation	indefelv	TOP-SPT
	lead plug	led-plug	LEGAL
	non standrda round iron post	round-ip	LEGAL
	non-standrda square iron post	squar-ip	LEGAL
	old pattern dominion iron post	domin-ip	LEGAL
	Refernece point	refpoint	LEGAL
	Rock Post - brass cap mounted in concrete or rock	rok-post	LEGAL
	spot elevation	spot-elv	TOP-SPT
	standard brass cap	brass-cap	LEGAL
	standrda iron pin	iron-pin	LEGAL
	test hole	testhole	GEO
	test pit	testpit	GEO
	traverse hub, detail hub etc	detailhub	PNTS
	unmarked measured point	msrd-pnt	PNTS
	witness point - with distance to true corner	wit-post	LEGAL
	wooden post	woodpost	LEGAL

Appendix B - Layer List

Appendix B - Layer List

GIS_LAYER	ENTITY	Layer	Line type	colour	line weight	SCREENING	text style/ block name
		SWR COMBINED	continuous	1	0.15	100	n/a
ENG SEWER COMBINED	Combined Gravity	SWR COMBINED AB	continuous	14	0.25	100	n/a
		SWR COMBINED T	continuous	1	0.25	100	NW DEFAULT
		SWR SANITARY	continuous	3	0.15	100	n/a
ENG SEWER SANITARY	Sanitary Gravity	SWR SANITARY AB	continuous	70	0.25	100	n/a
		SWR SANITARY T	continuous	3	0.15	100	NW DEFAULT
		SWR FORCEMAIN	continuous	202	0.15	100	n/a
ENG SEWER FORCE	Sanitary Force	SWR FORCEMAIN AB	continuous	205	0.25	100	n/a
		SWR FORCEMAIN T	continuous	202	0.25	100	NW DEFAULT
		SWR STORM	dashed (0.25)	133	0.15	100	n/a
ENG SEWER STORM	Storm	SWR STORM AB	dashed (0.25)	130	0.25	100	
		SWR STORM T	continuous	133	0.25	100	NW DEFAULT
ENG SEWER GVRD	GVSD	GVSDD	GVSDD	52	0.25	100	
ENG WATER MAIN	Water	WTR MAIN	continuous	5	0.15	100	
		WTR MAIN AB	continuous	172	0.25	100	
ENG WATER VALVE	Water valve	WTR VALVE	CONTINUOUS	7	0.25	100	ENG WATER VALVE
		WTR VALAE AB	continuous	7	0.25	100	ENG WATER VALVE
ENG WATER TEE	'T' or 'X' tee intersection connections	WTR TEE	continuous	7	0.15	100	ENG WATER TEE T or
		WTR TEE AB	continuous	7	0.15	100	ENG WATER TEE X
ENG WATER GVRD	GVWD	GVWD	GVWD	52	0.15	100	
	Hydro	E HYD	HYDRO	52	0.15	100	
	Gas	E GAS	GAS MAIN		0.15	100	
	Cable	E CAB	Cable TV	52	0.15	100	
	Telephone	E TEL	TELEPHONE	52	0.15	100	
	Electrical	E ELC	continuous	9	0.15	100	
		AB ELC	continuous	2	0.25	100	
ENG PARCEL EASEMENT	Easement	LGL EASEMENT	PHANTOM2	7	0.15	100	
ENG PARCEL ROW	RIGHT OF WAY	LGL ROW	PHANTOM2	7	0.15	100	
ENG PARCEL LEGAL	PROPERTY LINE	LGL PL	continuous	7	0.15	100	
		LGL PL AB	continuous	253	0.25	100	
ENG ISA MONUMENTS	Survey Monument	LEGAL	continuous	7	0.25	100	SEE FIGURE ?
ENG TOPOGRAPHY MINOR	Minor Contours	TOP-MIN	continuous	253	0.15	100	
ENG TOPOGRAPHY MAJOR	Major Contours	TOP-MAJ	continuous	253	0.15	100	
ENG TOPOGRAPHY SPOT	Spot evevation	TOP-SPT	continuous	253	0.15	100	ENG TOPP SPOT
ENG TOPOGRAPHY SPOT ANNO	spot elevation text	TOP-SPT T	continuous	253	0.15	100	
ENG ROAD FEATURE CURB	ROAD CURB	RD CURB	continuous	3	0.35	100	
		RD CURB AB	continuous	4	0.45	100	
ENG ROAD FEATURE SIDEWALK	SIDEWALK	RD SWLK	continuous	2	0.25	100	
		RD SWLK AB	continuous	3	0.35	100	
	SIDEWALK HATCH	RD SWLK HATCH	continuous	31	0.1	30	
		RD SWLK HATCH AB	continuous	32	0.1	50	
ENG ROAD FEATURE ROAD EDGE	EDGE OF PAVEMENT	RD EOP	continuous	6	0.2	75	
		RD EOP AB	continuous	6	0.2	100	
ENG ROAD FEATURE DRIVEWAY	DRIVEWAY	RD DWY	HIDDEN	46	0.15	75	
		RD DWY AB	HIDDEN	44	0.25	100	
ENG ROAD FEATURE TRAFFIC MARKING	TRAFFIC MARKING	RD TRAF MARK	continuous	9	0.15	100	
		RD TRAF MARK AB	continuous	6	0.2	100	
ENG ROAD FEATURE TRACKS	RAILWAY	RD RAIL	TRACKS	254	0.15		
		RD RAIL AB	TRACKS	255	0.25		
ENG_ROAD_FEATURE_STRUCT	ROAD STRUTURES	RD STRUCTURE	continuous	5	0.15		
	includes bridges, docks, ped overpasses, culvert bridges, bridge ramps, ped bridges,	RD_STRUCTURE_AB	continuous	5	0.25		
PLN BUILDING OUTERPOLY	BUILDING	BLD FOOTPRINT	continuous	7	0.15	100	
		BLD FOOTPRINT AB	continuous	15	0.2	100	
ENG ROAD FEATURE TRAIL	TRAIL	RD TRAIL	dashed (0.25)	12	0.15	100	
		RD TRAIL AB	dashed (0.25)	14	0.2	100	
	DETAILS	DETAIL	continuous	7	0.15	100	DIM
	DIMENSIONS	DIM	continuous	7	0.1	100	DIM
	MISC NOTE 1.5MM	NOTE1.5	continuous	7	0.25	100	NOTES1.5
	MISC NOTE 2.0MM	NOTE2.0	continuous	7	0.25	100	NOTES2.5
	MISC NOTE 3.0MM	NOTE3.0	continuous	7	0.25	100	NOTES3.0
	TEXT MASK	MASK	continuous	255	0.25	20	
	SHADING	SHADE	continuous	254	0.25	50	
	TRAVERSE POINTS	PNTS	continuous	254	0.25	100	SEE FIGURE ?
	TEST HOLES AND TEST PITS	GEO	continuous	254	0.25	100	SEE FIGURE ?