



PORT of
vancouver

Vancouver Fraser
Port Authority

Record drawing standards for infrastructure projects

Version 3

Department: Spatial Data Group – Engineering and Maintenance

June 4, 2021

Canada

Contents

1. Introduction.....	1
2. General standards.....	1
2.1. Drawing standards.....	1
2.2. Infrastructure project data.....	1
2.3. Project deliverables summary	1
2.3.1. Preconstruction	2
2.3.2. Post construction	2
2.4. Data provided by port authority at project start	2
2.5. Object Data Tables	4
2.6. Existing recorded infrastructure data.....	6
2.7. Issued for construction drawings	6
2.8. Record drawings.....	7
2.9. Title blocks.....	7
2.10. Drawing numbers.....	7
3. Drawing preparation – general.....	7
3.1. Coordinate system.....	8
3.2. Datum	8
3.3. Record drawing content.....	8
3.4. Plan view	9
3.5. Profile view	9
4. Drawing preparation – specific plan types	10
4.1. Storm and sanitary sewers	10
4.2. Water	11
4.3. Electrical drawings.....	11
4.4. Roads.....	12
4.5. Test/bore holes	12
4.6. Monitoring survey drawings.....	12
4.7. Miscellaneous services.....	12
Appendix A	13
Appendix B	16

1. Introduction

The Vancouver Fraser Port Authority has created this document to support the standards and procedures required for the completion of infrastructure and land development projects in the CAD environment.

These standards adhere to Master Municipal Construction Documents Association (MMCD) templates for AutoCAD and Civil 3D. The port authority has introduced AutoCAD Map 3D object data functionality to the MMCD Municipal CAD Standard to accommodate asset attribution. Consultants engaged with infrastructure design must obtain the Vancouver Fraser Port Authority MMCD Municipal CAD Standard template files directly from the port authority.

Hereinafter the term “CAD” means drawings created using AutoCAD or Civil 3D, and the term “VFPA template” refers to the “Vancouver Fraser Port Authority MMCD Municipal CAD drawing template”. Any suggestions or recommended changes to this manual are welcomed and should be directed to:

Supervisor, Spatial Data
Vancouver Fraser Port Authority
Engineering and Maintenance Department
100 The Pointe, 999 Canada Place
Vancouver, BC V6C 3T4

Phone: 604.665.9345
Fax: 1.866.284.4271

2. General standards

2.1. Drawing standards

The port authority will require CAD files for all drawing submissions created using the VFPA template. The use of a standard is required to maintain consistency in appearance and structure to facilitate post-construction record drawing submissions. The VFPA template can be used with both AutoCAD Civil 3D and AutoCAD. IFC and record drawings that are not in compliance will be returned for correction.

2.2. Infrastructure project data

The four (4) sets of data created for each infrastructure project are summarized in the following bullets:

1. **Existing recorded infrastructure data (by VFPA)** – existing infrastructure data sourced from port authority GIS, attributed using AutoCAD Map 3D object data and placed on layers beginning with **R-*** that reference the same layer groups as in the VFPA template
2. **Existing surveyed infrastructure data (by consultant)** – existing infrastructure asset data sourced from consultant’s pre-engineering topographic surveys in AutoCAD Civil 3D using **V-*** layers from the VFPA template
3. **Issued for construction drawings (by consultant)** – proposed infrastructure design data created by consultants in AutoCAD or Civil 3D using **C-*** layers in the VFPA template. This includes assigning AutoCAD Map 3D object data to infrastructure features.
4. **Record drawings (by consultant)** – construction infrastructure data created by consultants in AutoCAD or Civil 3D using **C-*** layers. This includes assigning AutoCAD Map 3D object data to infrastructure features.

2.3. Project deliverables summary

This section summarizes the specific items to be delivered by design consultants working on infrastructure projects authorized by the port authority.

Project deliverables consist of the existing surveyed infrastructure data drawing, issued for construction drawings, record drawings, and an AutoCAD Civil 3D file containing pipe network data for new sanitary, storm and water-main data modeled as pipe networks.

The consultant must provide digital submissions (in both CAD and PDF formats) in UTM NAD83 coordinate system with an engineer's stamp where applicable. Submitted PDF files should be able to be opened by Adobe Acrobat with no activation of security settings or password protection. For best results, drawings in Acrobat PDF file should be created directly from the CAD file at the original intended scale that is being certified correct. The PDF file name must correspond to the port authority's record drawing index number (Section 2.10 below).

The port authority requires separate water, drainage, sanitary, road, communication, streetlight, and traffic record drawings. For instance, drainage and sanitary records cannot be combined, nor can roads and water. All files associated with the CAD file (such as external references) must be included in either a ZIP archive, XML file, or e-Transmit for the final submission and send to the project's primary contact.

2.3.1. Preconstruction

The following list of deliverables is to be provided by the consultant to the port authority once design drawings are approved for construction:

1. **Infrastructure surveyed data drawing** – At project start, the port authority will provide consultants with an AutoCAD drawing file (DWG) containing existing recorded infrastructure data attributed using AutoCAD Map 3D object data tables. Consultant will provide topographic survey/utility locate data based on surveys. The object data tables in the existing recorded infrastructure data drawing are to be updated by the consultant to reflect the updates.
2. **Issued for construction drawings** – Consultant will provide IFC drawings prior to construction. Attribution of new infrastructure data will be completed using AutoCAD Map 3D object data tables.

2.3.2. Post construction

The following list of deliverables is to be provided by the consultant to the port authority once construction is complete:

1. **Record drawings** – Consultant will provide Record drawings after construction is complete. Attribution of new infrastructure data will be completed using AutoCAD Map 3D object data tables.
2. **AutoCAD Civil 3D file for pipe networks** – Consultant will provide pipe network data for sanitary, storm and water-main modeled using AutoCAD Civil 3D pipe networks.

2.4. Data provided by port authority at project start

At the beginning of the infrastructure design project, the port authority will provide consultants with a pre-design data package containing information on existing recorded infrastructure data drawing with AutoCAD Map 3D object data attached to infrastructure, road and property features represented with AutoCAD polylines and blocks.

R-* prefix modifier is used to identify layers containing existing recorded infrastructure data. This drawing does not contain AutoCAD Civil 3D data. Record data layer names are shown in the following illustration:

Vancouver Fraser Port Authority
Record drawing standards

S..	Name
///	R-COMB_ABANDONED
///	R-COMB_CATCH_BASIN
///	R-COMB_MANHOLE
///	R-COMB_OUTFALL
///	R-COMB_SEWER_PIPE
///	R-COMB_TEXT
///	R-COMM_ABANDONED
///	R-COMM_ABOVEGROUND_COND
///	R-COMM_CAP
///	R-COMM_MANHOLE
///	R-COMM_MISC
///	R-COMM_UNDERGROUND_CABLE
///	R-COMM_UTILITY_BOX
///	R-ELEC_ABANDONED
///	R-ELEC_ABOVEGROUND
///	R-ELEC_BUILDING
///	R-ELEC_CAP
///	R-ELEC_GROUNDING
///	R-ELEC_HIGH_MAST_TOWER
///	R-ELEC_KIOSK
///	R-ELEC_LAMP_STANDARD
///	R-ELEC_MANHOLE
///	R-ELEC_MISC
///	R-ELEC_NAVIGATION_LIGHT
///	R-ELEC_OVERHEAD_LINE
///	R-ELEC_POLE
///	R-ELEC_POLE_TAG
///	R-ELEC_RECEPTICAL
///	R-ELEC_REEFER_POST
///	R-ELEC_REEFER_TOWER
///	R-ELEC_SUBSTATION
///	R-ELEC_TEXT
///	R-ELEC_UNDERGROUND_DUCT
///	R-ELEC_UTILITY_BOX
///	R-ELEC_VAULT
///	R-FIBRE_ABANDONED
///	R-FIBRE_CABLE
///	R-FIBRE_CABLE_OVERHEAD
///	R-FIBRE_CAP
///	R-FIBRE_EQUIP
///	R-FIBRE_TEXT
///	R-FIBRE_UTILITY_BOX
///	R-FIBRE_VAULT
///	R-FUEL_CAP
///	R-FUEL_LINE
///	R-FUEL_MISC
///	R-FUEL_TEXT
///	R-FUEL_VALVE
///	R-GAS_ABANDONED
///	R-GAS_CAP
///	R-GAS_LINE_ABOVE
///	R-GAS_LINE_BELOW
///	R-GAS_METER
///	R-GAS_MISC
///	R-GAS_TEXT
///	R-GAS_UNDERGROUND_TANK
///	R-GAS_VALVE
///	R-PROC_ABANDONED
///	R-PROC_CATCH_BASIN
///	R-PROC_CLEANOUT
///	R-PROC_INTAKE
///	R-PROC_MANHOLE
///	R-PROC_OIL_WATER_SEPARATOR
///	R-PROC_OUTFALL
///	R-PROC_PIPE
///	R-PROC_PUMP_STATION
///	R-PROC_TEXT
///	R-SAN_ABANDONED
///	R-SAN_CAP
///	R-SAN_CATCH_BASIN
///	R-SAN_CLEANOUT
///	R-SAN_FORCE_MAIN
///	R-SAN_LIFT_STATION
///	R-SAN_MANHOLE

➤ R-SAN_MISC	
➤ R-SAN_OIL_INTERCEPTOR	
➤ R-SAN_OUTFALL	
➤ R-SAN_PUMPOUT_STATION	
➤ R-SAN_SEWER_PIPE	
➤ R-SAN_SUMP	
➤ R-SAN_TEXT	
➤ R-san_to_be_checked_in field	
➤ R-SAN_VALVE	
➤ R-STORM_ABANDONED	
➤ R-STORM_ARROW	
➤ R-STORM_CAP	
➤ R-STORM_CATCH_BASIN	
➤ R-STORM_CHAMBER	
➤ R-STORM_CLEANOUT	
➤ R-STORM_CULVERT	
➤ R-STORM_DITCH	
➤ R-STORM_HEADWALL	
➤ R-STORM_MANHOLE	
➤ R-Storm_manholes_survey_2010	
➤ R-STORM_MISC	
➤ R-STORM_OIL_INTERCEPTOR	
➤ R-STORM_OIL_WATER_SEPARATOR	
➤ R-STORM_OUTFALL	
➤ R-STORM_PUMP_STATION	
➤ R-STORM_SEWER_PIPE	
➤ R-STORM_SLOT_DRAIN	
➤ R-STORM_SUBDRAIN	
➤ R-STORM_SUMP	
➤ R-STORM_TRENCH_DRAIN	
➤ R-STORM_VALVE	
➤ R-STORM_VORTECH	
➤ R-TALLOW_ABANDONED	
➤ R-TALLOW_CAP	
➤ R-TALLOW_LINE	
➤ R-TEL_ABANDONED	
➤ R-TEL_CAP	
	➤ R-TEL_MANHOLE
	➤ R-TEL_OVERHEAD_LINE
	➤ R-TEL_SHIP
	➤ R-TEL_UNDERGROUND_CABLE
	➤ R-TEL_UTILITY_BOX
	➤ R-WATER_ABANDONED
	➤ R-WATER_BACKFLOW_PREVENTER
	➤ R-WATER_CAP
	➤ R-WATER_CASING
	➤ R-WATER_CHAMBER
	➤ R-WATER_HYDRANT
	➤ R-WATER_INTAKE
	➤ R-WATER_MAIN
	➤ R-WATER_MAIN_GVRD
	➤ R-WATER_MANHOLE
	➤ R-WATER_METER
	➤ R-WATER_MISC
	➤ R-WATER_REPAIR
	➤ R-WATER_SHIP
	➤ R-WATER_STANDPIPE
	➤ R-WATER_TEXT
	➤ R-WATER_VALVE
	➤ R-WATER_VALVE_PIT

Note: Existing recorded infrastructure data provided by the port authority at project initiation is not reliable for detailed design project activity. Consultants, therefore, are required to supplement pre-engineering existing recorded asset data with field data collected using topographic survey data collection and reduction practices.

The object data tables in the existing recorded drawing are the same tables as those in the construction recorded drawings.

2.5. Object Data Tables

AutoCAD Map 3D object data tables are defined in the VFPA template, and are used to attribute existing recorded and construction recorded drawings. The following table describes the object data tables used and their associated features to assign attributes to.

Object data table	Feature type	Associated features
Combined Sewer Line	polylines	combined sewer pipes
Combined Sewer Point	blocks	combined sewer manholes, catch-basins, caps and outfalls
Process Sewer Line	polylines	process sewer pipes
Process Sewer Point	blocks	process sewer manholes, catch-basins, oil water separators, cleanouts, pump stations, caps and outfalls
Storm Sewer Line	polylines	storm sewer pipes
Storm Sewer Point	blocks	storm sewer manholes, catch-basins, oil water separators, oil interceptors, cleanouts, pump stations, caps and outfalls
Sanitary Sewer Line	polylines	sanitary pipes
Sanitary Sewer Point	blocks	sanitary sewer manholes, catch-basins, oil interceptors, cleanouts, pump stations, caps and outfalls
Water Line	polylines	water pipes
Water Point	blocks	water manholes, valves, check valves, hydrants, backflow preventers, meters, chambers, standpipe, caps and ship water
Gas Line	polylines	gas pipes
Gas Point	blocks	gas valves, meters and caps
Fuel Line	polylines	fuel pipes
Fuel Point	blocks	fuel valves and caps
Tallow Line	polylines	tallow pipes
Communications Line	polylines	communication ducts/cables
Communications Point	blocks	communication utility boxes, manholes and cap
Electrical Line	polylines	electrical ducts/cables
Electrical Point	blocks	electrical utility boxes, manholes, high mast towers, lamp standards, kiosks and caps
Fibre Optic Line	polylines	fibre optic ducts/cables
Fibre Optic Point	blocks	fibre utility boxes, vaults and caps
Telephone Line	polylines	telephone ducts/cables
Telephone Point	blocks	telephone utility boxes, manholes and cap

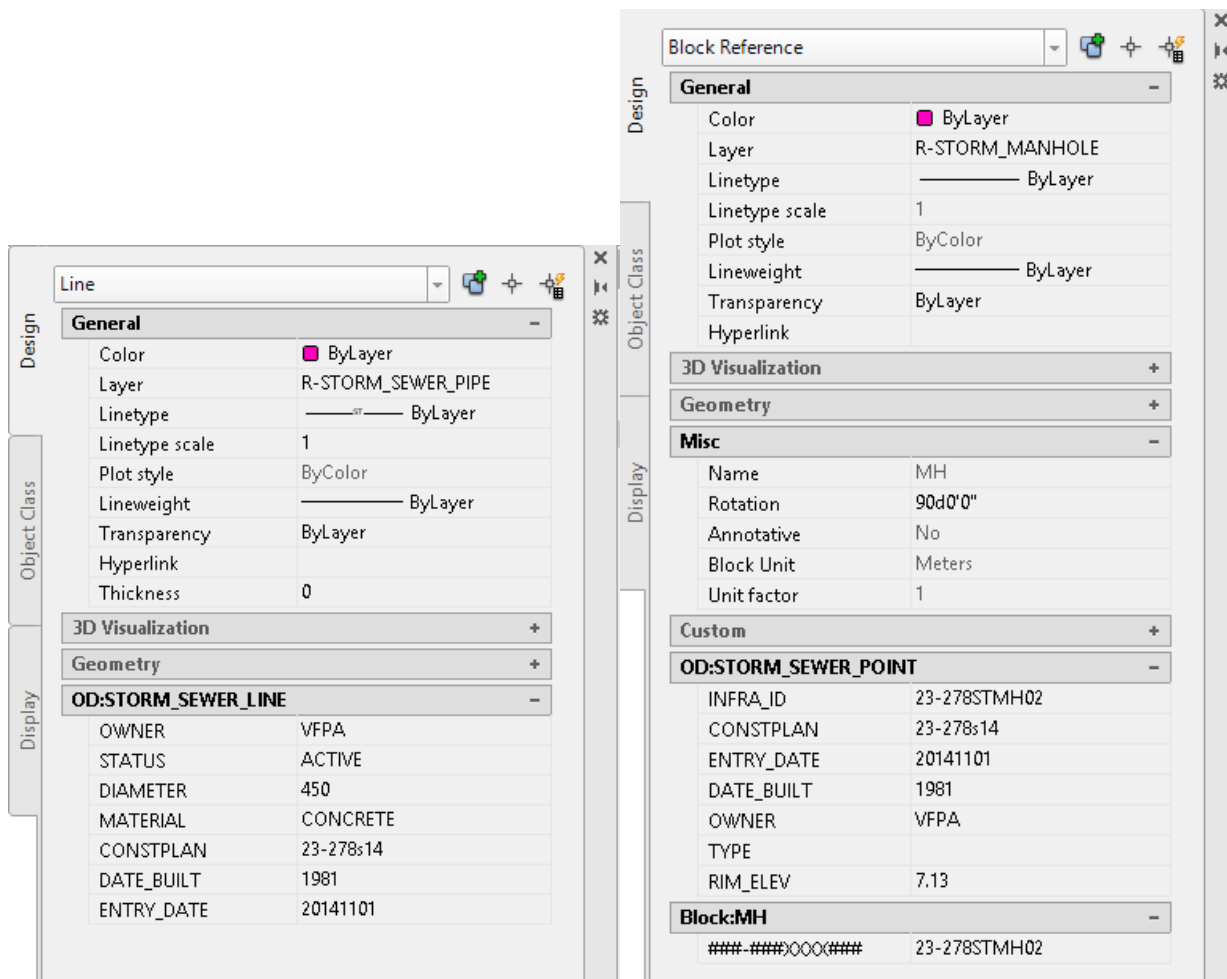
Refer to Appendix A for steps to attach object data tables.

2.6. Existing recorded infrastructure data

This section describes attribution for existing recorded infrastructure data.

The existing recorded infrastructure drawing is provided by the port authority to consultants at project initiation, and contains attributed infrastructure data in the project area that is sourced from port authority GIS. AutoCAD Map 3D object data tables are used to assign attributes to existing recorded infrastructure data.

An example of pipe and manhole attributes is shown in the following illustration. Note that the Map 3D object data is exposed in the AutoCAD properties palette.



The AutoCAD properties palette is especially useful for viewing all properties of similar entities and objects, and for editing object data simultaneously for multiple similar attributes referencing the same AutoCAD Map 3D object data table.

2.7. Issued for construction drawings

Issued for construction drawings are created using UTM NAD 83 coordinates. These drawings are created by copying the design model drawing(s) and updating the drawing to reflect final approved design.

Sanitary, storm, water, electrical, etc. infrastructure is represented with AutoCAD polylines and blocks. Physical properties must be assigned in AutoCAD Map 3D using object data tables. Use AutoCAD Civil 3D pipe networks to model sanitary, storm and water infrastructure.

2.8. Record drawings

Record drawings are created using UTM NAD 83 coordinates. These drawings are created by copying the issued for construction drawing(s) and updating the drawing to reflect as-constructed conditions.

Sanitary, storm, water, electrical, etc. infrastructure is represented with AutoCAD polylines and blocks. Physical properties must be assigned in the AutoCAD Map 3D using object data tables. Use AutoCAD Civil 3D pipe networks to model sanitary, storm and water infrastructure.

2.9. Title blocks

The port authority will supply title blocks for all sheet sizes. Title blocks and drawing numbers will be provided at the beginning of the project. The consultant can modify the title block to accommodate his own numbering system, but the port authority's project number with drawing number must be dominant in the bottom right corner of the drawing.

2.10. Drawing numbers

The port authority uses a four part numbering system (i.e., ###-###-DI-###). The first two or three digits represent the port authority site number that the project falls under. The next set of digits (after the first hyphen) is the port authority-assigned project number. The next two to three letters are the discipline identifier. The last three digits are for sheet numbers.

Example: **34-123-UT-001** refers to port authority site **34** (Roberts Bank)-**123** (project number assigned by the port authority)-**UT** (discipline identifier and in this example "utilities")-**001** (sequential sheet number).

Discipline identifier list:

AR	Architectural
CI	Civil
CM	Communications
EL	Electrical (fibre optic cable, hydro, overhead lines, underground lines, utility poles, telephone)
EV	Environmental (test holes, boreholes)
FP	Fire protection
GA	General
GT	Geotechnical
HM	Hazardous materials
LS	Landscape
MA	Marine
ME	Mechanical (plumbing, HVAC)
RD	Road
RL	Rail
SE	Security
SL	Street lighting
ST	Structural
SV	Survey
UT	Utilities (water, storm, sanitary, gas lines, fuel lines)

For demolition drawings, add 'D' to discipline identifier (i.e., AR-D for architectural demolition, CI-D for civil demolition, ST-D for structural demolition).

3. Drawing preparation – general

- The record drawing submission shall include a drawing index that lists all drawing sheets contained in the project; partial submissions are not accepted
- A letter of certification or professional engineer's electronic seal and digital signature applied to the submitted PDF drawing file(s) confirming the accuracy of the record drawings must be provided

- c) Each plan sheet should be considered a standalone record. All notes that refer to the sheet should be shown on that sheet. A separate plan sheet containing notes that refer to various sheets within the project is not acceptable. Exceptions to this rule are references to standard details or key plans.
- d) CAD drawings are required for all projects. All associated files (such as xref's, special fonts, and ctb files) used to create the drawings should be included.
- e) All construction or modifications are to be shown and distinguished from the existing items by different line weights
- f) Notes pertaining to the construction or modifications are to be shown on that drawing
- g) All elevations and coordinates are to be in meters and displayed to the nearest 0.001 meters. The dimensions and offsets for service connections, wyes, etc. are to be shown to the nearest 0.1 meters. Those dimensions and offsets are for the convenience of port authority maintenance workers for location purposes only.
- h) A key plan is required to indicate the location and scope of the works where locations are not obvious
- i) In the CAD model space, all features are to be drawn at a 1:1 metric scale. For example, a feature measuring one meter length will be drawn as one unit long. Model space features should never be rescaled for plotting purposes.
- j) All information will be audited to ensure accuracy, completeness, and compliance with these specifications
- k) All spot elevations and contour lines are to be hidden in the PDF versions
- l) For service connections, all offsets from the property line must be indicated. In addition, the invert elevation, diameter, material, and depth at property line from existing ground level must be shown.
- m) Drawing must be to scale, meaning if length or location are changed during construction, the drawing (not just dimensions) should be changed

3.1. Coordinate system

The port authority uses Universal Transverse Mercator (U.T.M.) Zone 10 North NAD83 coordinate system for all engineering drawings. If you are using an assumed coordinate system you must ensure that all new construction is surveyed and tied into UTM monuments. All surveys must be connected to the Integrated Survey System. AutoCAD drawing units should be set to meters and three decimal places.

3.2. Datum

For Burrard Inlet, all structures on the water (e.g., piers, dolphins, wharfs, docks) the port authority uses the hydrographic (chart) datum. Chart datum = geodetic datum + 2.975m. Structures not associated with marine activity can be geodetic datum. The datum type must be shown either on the drawing or in the general notes. Please contact Supervisor, Spatial Data Group for datums to be used on Fraser River.

3.3. Record drawing content

- a) Project cover sheet showing key plan of the overall site and the area of construction/repair
- b) Drawing index with reference to all drawings in the contract in port authority record drawing number style (see **Section 2.10 Drawing numbers**)

The port authority uses a four part numbering system (i.e., ###-###-DI-###). The first two or three digits represent the port authority site number that the project falls under. The next set of digits (after the first hyphen) is the port authority-assigned project number. The next two to three letters are the discipline identifier. The last three digits are for sheet numbers.

Example: **34-123-UT-001** refers to port authority site **34** (Roberts Bank)-123 (project number assigned by the port authority)-UT (discipline identifier and in this example "utilities")-001 (sequential sheet number).

Discipline identifier list:

AR Architectural

CI	Civil
CM	Communications
EL	Electrical (fibre optic cable, hydro, overhead lines, underground lines, utility poles, telephone)
EV	Environmental (test holes, boreholes)
FP	Fire protection
GA	General
GT	Geotechnical
HM	Hazardous materials
LS	Landscape
MA	Marine
ME	Mechanical (plumbing, HVAC)
RD	Road
RL	Rail
SE	Security
SL	Street lighting
ST	Structural
SV	Survey
UT	Utilities (water, storm, sanitary, gas lines, fuel lines)

- c) For demolition drawings, add 'D' to discipline identifier (i.e., AR-D for architectural demolition, CI-D for civil demolition, ST-D for structural demolition). for details)
- d) Symbol legend to be included in the drawing set
- e) Design criteria to be included in general notes
- f) Drawings and procedures are to follow port authority standards where applicable
- g) For all water mains and storm and sanitary sewers, profiles must be provided with plan and profile views on the same sheet

3.4. Plan view

- a) The plan view is to be drawn to a scale that appropriately shows the scope of work and the vertical profiles are to be exaggerated to clearly show the grade difference
- b) All offsets of both existing and new services shall be indicated to the nearest 0.1 m and referenced to a property line. If property line is not known or inconvenient, then the offset from the chainage line or edge of pavement should be included. Service connections are to be dimensioned from some known point (i.e., a property line or edge of a building).
- c) Benchmarks or survey monuments are to be shown where known
- d) A north arrow is to be clearly marked and all the street names indicated outside of the road boundaries
- e) New works are to be drafted in bold lines and existing services in a light color (grey preferred)
- f) All work done must be shown (e.g., removal/replacement of manholes, valve chambers, cleanouts) and clearly noted on the appropriate drawing
- g) All drawings must clearly show the abandoned/removed utilities at exact locations and extent to which it applies. Abandoned services must also include capped connection locations and/or notes pertaining to how they were left in the field (i.e., grout filled for abandoned pipe, grouted stub ends for removed catch basins).
- h) The rim, invert, and depth are to be shown for all new manholes and existing ones being tied into. Manhole tables may be used to simplify this.
- i) All services must be shown in their correct geospatial location
- j) Where existing services are uncovered, the location and invert (or depth) of cover shall be noted on drawing

3.5. Profile view

- a) The profile view will show:

- Chainage noted at the baseline for all profiles
 - Elevations of new and existing works
 - New and existing service connections
 - Mains/services being crossed by the new works (and their elevations)
 - All data pertaining to the design of the works including diameter, material, and slope for pipes and rim elevations and inverts for all manholes are to be clearly marked
 - All data will be based on U.T.M. grid coordinates
- b) All grade changes are to show ties to lot corners
- c) Profiles are to line up with the plan view
- d) The material types, class, and size (e.g., PVC C900, Concrete CL III) must be shown on the profile for all pipes
- e) All manhole and clean-out sizes are to be noted
- f) Profiles must be shown for all sanitary (for pipes greater than 100 mm diameter) and storm services (for pipes greater than 150 mm diameter) except where the installation of connections from an existing main is the only work performed
- g) Note additional requirements pertaining to specific drawings in Section 4

4. Drawing preparation – specific plan types

The port authority requires separate water, drainage, sanitary, road, streetlight, and traffic record drawings. Drainage and sanitary, or water and roads cannot be combined.

4.1. Storm and sanitary sewers

- a) AutoCAD entities (blocks and polylines) can be used for storm and sanitary sewer designs. A single entity (polyline) is required to represent a storm/sanitary sewer pipe between manholes.

Use the following naming convention for storm/sanitary sewer manholes, catch-basins:

34-123-STMH01

34-123-STMH01 refers to port authority site **34** (Roberts Bank)-**123** (project number assigned by the port authority)-**STMH** (storm manhole)**01** (sequential sheet number)

- b) Connections of 100 mm diameter and greater shall be shown and noted on the plan with locations from lot corners
- c) Main size, class, material, and manhole size are to be shown along with all elevations
- d) Where a main ties to an existing stub, the balance of the distance to the existing manhole (from the design main) is to be shown
- e) All lawn drains are to be dimensioned from the lot corners and include the size, material, and rim elevation, along with the size, material, and elevation of the lead
- f) Minimum building elevations (MBE) are required
- g) The 100 year hydraulic grade line (HGL) for storm is to be shown, plotted on profile of the system components, and compared with MBE in order to demonstrate flood protection
- h) Detention pond information required:
- a. All pipes with size, inverts, and location
 - b. Capacity, high water elevation, base elevation
 - c. Control device(s) particulars
 - d. Location, size, and elevation of all manholes, catch basins, etc.
- i) Catch basins are to show rim elevation, offsets from property lines, and catch basin lead length
- j) Particular attention should be paid to the requirement that location of service connections be shown both at the main “wye” and at the property line with the depth, size, and invert

4.2. Water

- a) AutoCAD entities (polylines and blocks) can be used for watermain designs.

A single entity (polyline) is required to represent watermain pipe between fittings. Use the following naming convention for water valves, manholes, hydrants, chambers, backflow preventers, meters, etc.:

34-123-WMH01

34-123-WMH01 refers to port authority site **34** (Roberts Bank)-**123** (project number assigned by the port authority)-**WMH** (Water Manhole) **01** (sequential sheet number).

- b) All connections and fittings used are to be shown dimensioned related to the property line, where possible in reference to some easily recognizable surface feature. (e.g., building, edge of pavement, utility pole). If no reference point is available then a surveyed reference co-ordinate shall be provided complete with invert
- c) Water connections 100 mm diameter and greater shall show size with elevation on plan view. Service box type shall be indicated on the plan.
- d) The location of all bend points along horizontal or vertical curves are to be dimensioned related to the property line
- e) Between each grade change, show the length and grade of that segment. A list of materials with manufacturers name and model number for all fittings is to be provided. Consultant is to verify connections, whether hub, flanged or mechanical.
- f) Details shall be provided in areas such as tee and cross intersections where dimensioning and other information cannot be adequately conveyed at the main drawing scale
- g) Water mains smaller than 100 mm diameter do not require a profile unless directed by the engineering department.
- h) All lengths of pipe are to be labeled with the length, size, material and class of pipe
- i) Special fittings, coating, cathodic protection systems, etc. must be detailed on the drawings. All appurtenances shall show manufacturers name and/or material type.

4.3. Electrical drawings

- a) AutoCAD entities (polylines and blocks) can be used for electrical designs.

A single entity (polyline) is required to represent electrical cables/conduits. Use the following naming convention for manholes, junction boxes, meters, etc.:

34-123-EMH01

34-123-EMH01 refers to port authority site **34** (Roberts Bank)-**123** (Project Number assigned by the port authority)-**EMH** (Electrical Manhole)-**01** (sequential sheet number)

- b) Electrical drawings (including fibre optic cable, hydro, telephone, communication, etc.):
- Must show the duct bank run
 - Must clearly show the branches coming off from the duct bank
 - Must show all junction boxes, vaults, kiosks, service cabinets, transformers, substations etc.
 - All duct banks and branches should have detailed description notes stating number of conduits and sizes. The same is required for each conduit the wires/cables installed inside and the voltage where applicable.
 - Ownership of cables and service provided should be stated if known
 - For multiple conduits in a duct bank, a section showing details and cross section of the arrangement and depth of cover should be included
- c) Street lighting:

- The drawings will only include plan views. No profiles are required. All improvements (e.g., service boxes, poles) are to be related to property lines
- Drawings are to include illumination design data such as street name, land use, road classification, illumination type, illumination level, and uniformity ratio
- Pertinent information (e.g., notes on existing lighting and service locations) must be retained. All other underground services and non-essential information should be removed from the plan.

4.4. Roads

- a) A table showing horizontal curve and curve return data is to be shown on the road drawing
- b) Pavement tapers are to be dimensioned with length of taper and the offset to existing pavement
- c) The record drawing is to indicate the width of sidewalk, type of materials used, and surface elevations. The offset of the sidewalk to the property line is to be shown.
- d) Show all street furniture and features such as trees, traffic devices/signals, lamp standards, concrete barriers, guard rails, hand rails, integrated survey control monuments, etc.
- e) The drawing will show the road geometrics and road markings

4.5. Test/bore holes

- a) UTM coordinates for the test hole locations
- b) Where a plan shows bore holes, an accompanying drawing must be included to show bore/test-hole data. No reference should be made to a separate report for data.

4.6. Monitoring survey drawings

- a) Monitoring survey drawings should be in UTM NAD 83 coordinate system
- b) Must include metadata (especially the vertical datum used)

4.7. Miscellaneous services

- a) Gas/fuel lines and others should conform to content under water mains and sewers where applicable, however, profiles are not mandatory
- b) Existing infrastructure within the project area should be clearly shown including:
 - Water infrastructure services
 - Storm infrastructure services
 - Sanitary infrastructure services
 - Utility poles
 - Gas lines
 - Underground and overhead electrical lines
 - Edge of pavement
 - Ditches
- c) Utilities discovered in the field that are different from plan should be noted for service, material, diameter, and location either by GPS or hand measured with reference to some identifiable object (e.g., building, edge of sidewalk, fire hydrant)

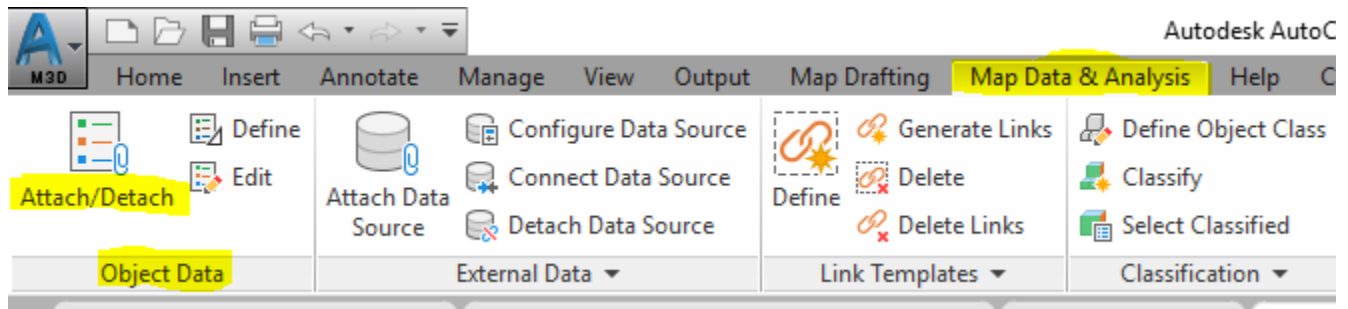
Appendix A

Attaching object data tables

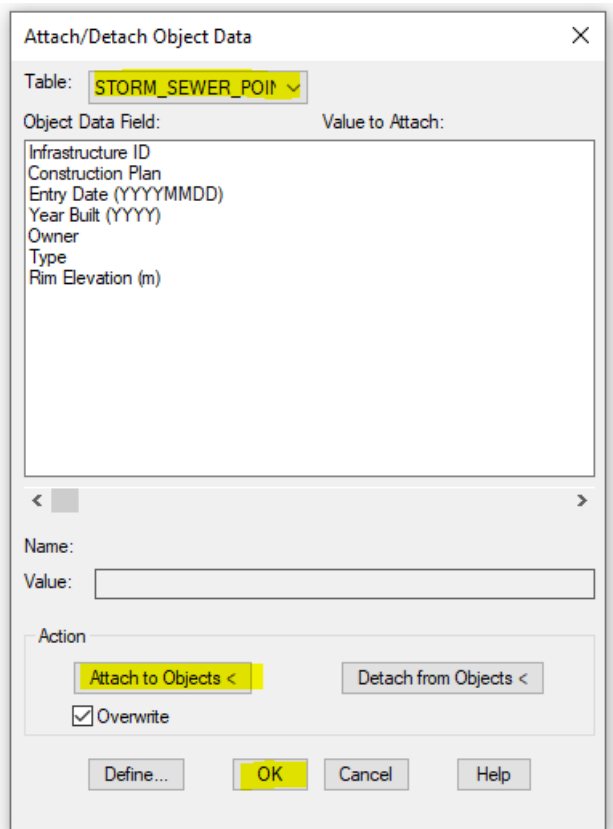
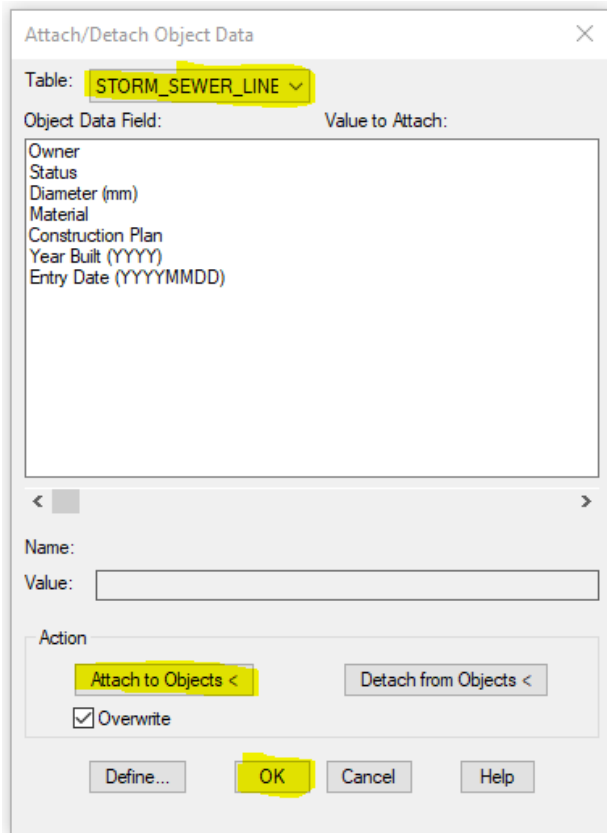
This section will describe how to attach data to polyline or block objects. Ensure that both block and block tag are on correct layers upon insertion in drawing.

In Map 3D select Map Data & Analysis tab.

1. Click on Object Data > Attach/Detach



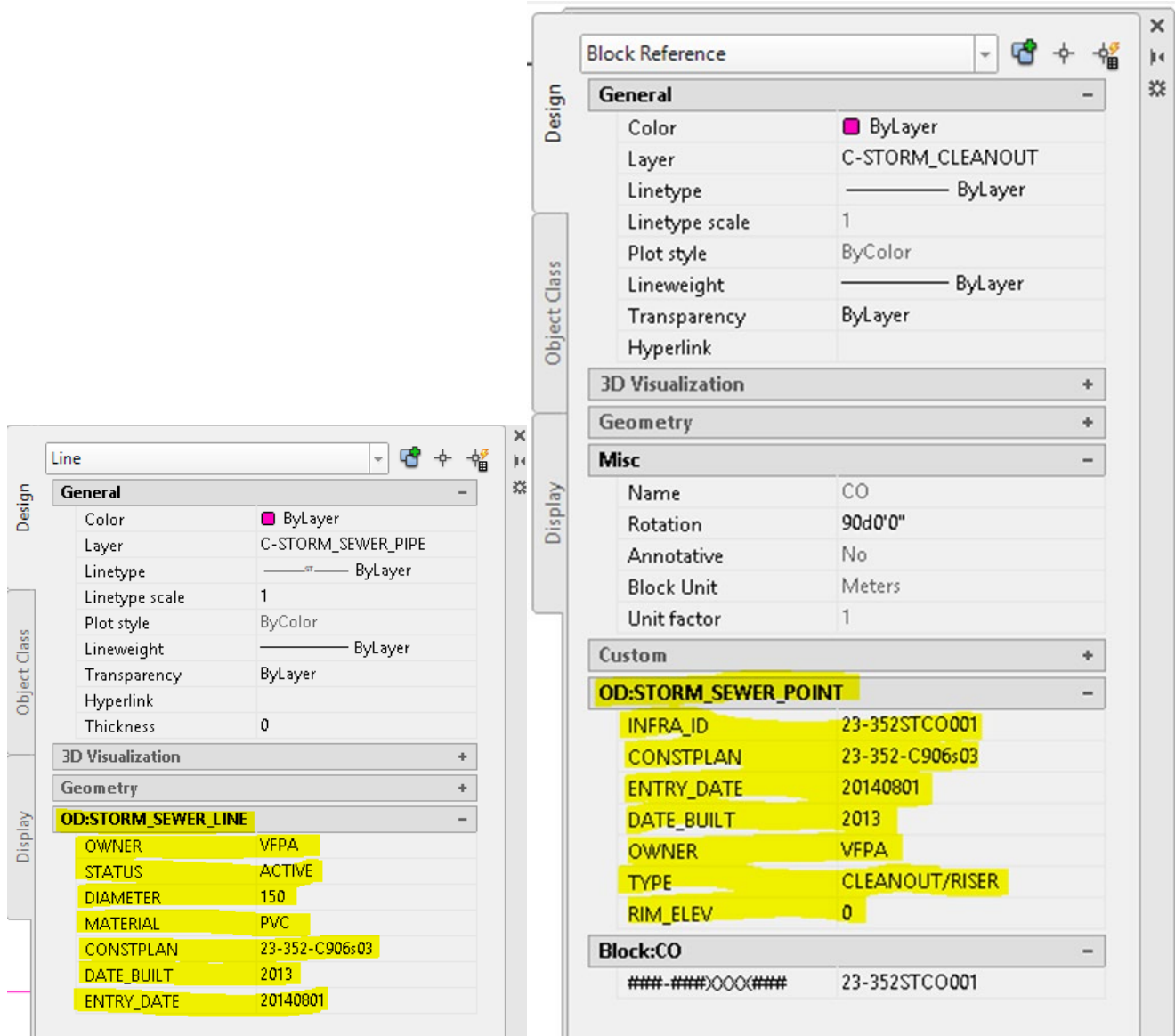
2. Choose either line or point table for the utility e.g. Storm Sewer. This is similar for all civil utilities.



3. Click on Attach to Objects > OK

Vancouver Fraser Port Authority
Record drawing standards

4. Select polyline or block > enter
5. Select object in drawing > Properties
6. Fill in fields in the Object Data Table as shown below



INFRA ID should be the same as the block tag number.

The following images are tables and properties for electrical line and point. These are similar for communication, fibre optic, and telephone utilities.

Vancouver Fraser Port Authority
Record drawing standards

Attach/Detach Object Data

Table: **ELECTRICAL_LINE**

Object Data Field: Value to Attach:

OWNER
STATUS
TYPE
CONSTPLAN
Year Built (YYYY)
Entry Date (YYYYMMDD)
VOLTAGE

Name: Value:

Action

Attach to Objects < Detach from Objects <

Overwrite

Define... OK Cancel Help

Attach/Detach Object Data

Table: **ELECTRICAL_POINT**

Object Data Field: Value to Attach:

INFRA_ID
CONSTPLAN
Entry Date (YYYYMMDD)
Year Built (YYYY)
TYPE
OWNER

Name: Value:

Action

Attach to Objects < Detach from Objects <

Overwrite

Define... OK Cancel Help

Line

Design

Object Class

Display

General

Color ByLayer
Layer C-ELEC_UNDERGROUND_...
Linetype ——— ByLayer
Linetype scale 1
Plot style ByColor
Lineweight ——— ByLayer
Transparency ByLayer
Hyperlink
Thickness 0

3D Visualization +

Geometry +

OD:ELECTRICAL_LINE

OWNER VFPA
STATUS ACTIVE
TYPE
CONSTPLAN 32-409-F-03-305
DATE_BUILT 2007
ENTRY_DATE 20100321
VOLTAGE 12000

Block Reference

Design

Object Class

Display

General

Color ByLayer
Layer C-ELEC_MANHOLE
Linetype ——— ByLayer
Linetype scale 1
Plot style ByColor
Lineweight ——— ByLayer
Transparency ByLayer
Hyperlink

3D Visualization +

Geometry +

Misc

Name MH
Rotation 90d'0"
Annotative No
Block Unit Meters
Unit factor 1

Custom +

OD:ELECTRICAL_POINT

INFRA_ID 32-409EMH51
CONSTPLAN 32-409-F-03-305
ENTRY_DATE 20100321
DATE_BUILT 2007
TYPE ELECTRICAL MANHOLE
OWNER VFPA

Block:MH

##D###
32-409EMH51

Appendix B

This image of the drawing template file shows the standard layers and blocks. The template file has standard object data tables for points and lines used for utilities. It also has VFPA title-blocks.

Category	Layers	Blocks	Category	Layers	Blocks	Category	Layers	Blocks																											
COMBINED SEWER	COMBINED SEWER - LAYERS C-COMB_ABANDONED C-COMB_CATCH_BASIN C-COMB_MANHOLE C-COMB_OUTFALL C-COMB_SEWER_PIPE C-COMB_TEXT COMB_TAG	COMBINED SEWER - BLOCKS CAP CB - CATCH BASIN MH - MANHOLE OF - OUTFALL	FUEL	FUEL - LAYERS C-FUEL_ABANDONED C-FUEL_CAP C-FUEL_LINE C-FUEL_MISC C-FUEL_TEXT C-FUEL_VALVE FUEL_TAG	FUEL - BLOCKS CAP PUMP VLV - VALVE (Specify type in object data)	STORM SEWER	STORM SEWER - LAYERS C-STORM_ABANDONED C-STORM_ARROW C-STORM_CAP C-STORM_CATCH_BASIN C-STORM_CHAMBER C-STORM_CLEANOUT C-STORM_CULVERT C-STORM_DITCH C-STORM_HEADWALL C-STORM_MANHOLE C-STORM_MISC C-STORM_OIL_INTERCEPTOR C-STORM_OIL_WATER_SEPARATOR C-STORM_OUTFALL C-STORM_PUMP_STATION C-STORM_SEWER_PIPE C-STORM_SLOT_DRAIN C-STORM_SUBSTATION C-STORM_SUMP C-STORM_TRENCH_DRAIN C-STORM_VALVE C-STORM_VORTECH STORM_TAG	STORM SEWER - BLOCKS ARROW CAP - CAP OR PLUG (Specify type in object data) CB - CATCH BASIN CHAMBER CO - CLEANOUT CULVERT DETENTION POND HEADWALL PUMP - PUMP STATION MH - MANHOLE REDUCER SEPARATOR - OIL INTERCEPTOR SEPARATOR - OIL WATER SEPARATOR OF - OUTFALL SUMP SWALE TRENCH DRAIN VLV - VALVE VORTECH - VORTECH SEPARATOR (Specify type in object data)	COMMUNICATION	COMMUNICATION - LAYERS C-COMM_ABANDONED C-COMM_ABOVEGROUND_COND C-COMM_CAP C-COMM_MANHOLE C-COMM_MISC C-COMM_UNDERGROUND_CABLE C-COMM_UTILITY_BOX COMM_TAG	COMMUNICATION - BLOCKS CAP MH - MANHOLE UB - UTILITY BOX	GAS	GAS - LAYERS C-GAS_ABANDONED C-GAS_CAP C-GAS_LINE_ABOVE C-GAS_LINE_BELOW C-GAS_METER C-GAS_MISC C-GAS_TEXT C-GAS_UNDERGROUND_TANK C-GAS_VALVE GAS_TAG	GAS - BLOCKS CAP MET - METER TANK VLV - VALVE (Specify type in object data)	TALLOW	TALLOW - LAYERS C-TALLOW_ABANDONED C-TALLOW_CAP C-TALLOW_LINE TALLOW_TAG	TALLOW - BLOCKS CAP	ELECTRICAL	ELECTRICAL - LAYERS C-ELEC_ABANDONED C-ELEC_ABOVEGROUND C-ELEC_BUILDING C-ELEC_CAP C-ELEC_GROUNDING C-ELEC_HIGH_MAST_TOWER C-ELEC_KIOSK C-ELEC_LAMP_STANDARD C-ELEC_MANHOLE C-ELEC_MISC C-ELEC_NAVIGATION_LIGHT C-ELEC_OVERHEAD_LINE C-ELEC_POLE C-ELEC_POLE_TAG C-ELEC_RECEPICTICAL C-ELEC_REEFER_POST C-ELEC_REEFER_TOWER C-ELEC_SUBSTATION C-ELEC_TEXT C-ELEC_UNDERGROUND_DUCT C-ELEC_UTILITY_BOX C-ELEC_VAULT ELEC_TAG	ELECTRICAL - BLOCKS BULL RAIL SERVICE BOX CAP CRANEPOWER - CRANE POWER HMT - HIGH MAST TOWER KIOSK LT - LAMP STANDARD MH - MANHOLE NAVLT - NAVIGATION LIGHT PP - POWER POLE REEF-POST - REEFER STATION REEF-TOWER - REEFER TOWER SHIPPOWER - SHIP POWER SHOREPOWER - SHORE POWER SUBSTATION UB - UTILITY BOX (UB, PB, LB) (Specify type in object data) VAULT	PROCESS SEWER	PROCESS SEWER - LAYERS C-PROC_ABANDONED C-PROC_CATCH_BASIN C-PROC_CLEANOUT C-PROC_INTAKE C-PROC_MANHOLE C-PROC_OIL_WATER_SEPARATOR C-PROC_OUTFALL C-PROC_PIPE C-PROC_PUMP_STATION C-PROC_TEXT PROC_TAG	PROCESS SEWER - BLOCKS CAP CB - CATCH BASIN CO - CLEANOUT INTAKE MH - MANHOLE SEPARATOR - OIL WATER SEPARATOR OF - OUTFALL PUMP - PUMP STATION	TELEPHONE	TELEPHONE - LAYERS C-TEL_ABANDONED C-TEL_ABOVEGROUND C-TEL_CAP C-TEL_MANHOLE C-TEL_MISC C-TEL_OVERHEAD_LINE C-TEL_PIPE C-TEL_TEXT C-TEL_UNDERGROUND_CABLE C-TEL_UTILITY_BOX TEL_TAG	TELEPHONE - BLOCKS CAP MH - MANHOLE SHIP TELEPHONE UB - UTILITY BOX (UB, PB, LB) (Specify type in object data)	FIBRE OPTIC	FIBRE OPTIC - LAYERS C-FIBRE_ABANDONED C-FIBRE_CABLE C-FIBRE_CABLE_OVERHEAD C-FIBRE_EQUIP C-FIBRE_TEXT C-FIBRE_UTILITY_BOX C-FIBRE_VAULT FIBRE_TAG	FIBRE OPTIC - BLOCKS CAP KIOSK UB - UTILITY BOX (UB, PB, LB) (Specify type in object data) VAULT	SANITARY SEWER	SANITARY SEWER - LAYERS C-SAN_ABANDONED C-SAN_CAP C-SAN_CATCH_BASIN C-SAN_CLEANOUT C-SAN_FORCE_MAIN C-SAN_LIFT_STATION C-SAN_MANHOLE C-SAN_MISC C-SAN_OIL_INTERCEPTOR C-SAN_OUTFALL C-SAN_PUMPOUT_STATION C-SAN_SEWER_PIPE C-SAN_SUMP C-SAN_TEXT C-SAN_VALVE SAN_TAG	SANITARY SEWER - BLOCKS CAP CO - CLEANOUT PUMP - LIFT STATION MH - MANHOLE SEPARATOR - OIL INTERCEPTOR OF - OUTFALL PUMPOUT - PUMPOUT STATION SUMP VLV - VALVE (Specify type in object data)	WATER	WATER - LAYERS C-WATER_ABANDONED C-WATER_BACKFLOW_PREVENTER C-WATER_CAP C-WATER_CASING C-WATER_CHAMBER C-WATER_CLEANOUT C-WATER_HYDRANT C-WATER_INTAKE C-WATER_MAIN C-WATER_MANH_GWRD C-WATER_MANHOLE C-WATER_METER C-WATER_REPAIR C-WATER_SHIP C-WATER_STANDPIPE C-WATER_TEXT C-WATER_VALVE C-WATER_VALVE_CHECK C-WATER_VALVE_FT WATER_TAG	WATER - BLOCKS BFP - BACKFLOW PREVENTER CAP CHAMBER CO - CLEANOUT FH - HYDRANT INTAKE MH - MANHOLE MET - METER REDUCER FREEZE PIPE SHIP WATER STANDPIPE VLV - VALVE (Specify type in object data) VLV-CI - VALVE-CHECK
NOTES: 1. CHANGE BLOCK TAG TO CORRECT LAYER UPON INSERTION. DOUBLE CLICK ON BLOCK > ENHANCED ATTRIBUTE EDITOR > PROPERTIES.		CONSULTANT LOGO & DETAILS		PORT of vancouver Vancouver Fraser Port Authority ENGINEERING DEPARTMENT		VANCOUVER FRASER PORT AUTHORITY VFPA MMCD MUNICIPAL CAD STANDARD TEMPLATE VFPA-MMCD Municipal CAD Standard Template																													
Ref. No.	REFERENCE	No.	Date	REVISION	Drn	Qtd	APP. SITE																												