



2020 - SECTION 1

REQUIREMENTS FOR PRE AND POST CONSTRUCTION, DRAFTING STANDARDS AND DIGITAL SUBMISSIONS

1.1 GENERAL

Prior to the start of Construction, Aquatera **Utilities Inc.** shall be contacted to participate in the pre-construction meeting with the Consulting Engineer and Contractor.

- a) The initial drawing submission and any subsequent submissions shall be submitted directly to Aquatera and shall include one set of full size drawings unless otherwise specified by Aquatera.
- b) Provision of the final Detailed Engineering Drawings, signed off by the Developer's Engineer, Aquatera, and the appropriate municipality. The drawings shall be submitted to Aquatera as noted below:
 - i) One large full set, A1
 - ii) Memory stick or digital downloadable files with approved (stamped and signed by the Consultant, Aquatera and City/County/Town of Sexsmith) design drawing in digital format (PDF and AutoCAD). AutoCad drawings do not require the digital stamp.
- c) Servicing Agreement endorsed by the appropriate municipality and/or Aquatera.
- d) Notification given to Aquatera, in writing, when the construction is intended to begin.
- e) Any necessary permits, agreements endorsed by the signing authority.
- f) Existing infrastructure within the construction boundaries affected by construction, shall be adjusted to the new elevation and meet the current years' specifications and standards.
- g) If field conditions have affected the design elevations, all infrastructure shall adhere to and be adjusted to Aquatera standards.
- h) If at **Construction Completion Certificate** inspections, roads, sidewalks, curbs etc. are not constructed, it shall be the contractor/developers' obligation to adjust surface infrastructure to meet Aquatera standards prior to **Final Acceptance Certificate**.
- i) If at FAC grades have changed and standards are not met, infrastructure shall be adjusted to meet standards as per the year of construction.



- j) If the development does not proceed in the immediate or forth coming construction season, Aquatera reserves the right to review and approve the drawings prior to construction.

1.2 DRAFTING STANDARDS/REQUIREMENTS

- a) The direction of flow of sanitary mains, and the manhole frame and cover table shall be shown on the municipal overall drawing.
- b) Profile drawings are required for all water and sanitary sewer alignments.
- c) For Low pressure sanitary sewer, tank and pump details are required on design drawings and proof of caveat registration needs to be provided prior to Aquatera issuing the CCC. The developers' consultants will make efforts to register this on title as a condition of subdivision.
- d) Overall & Disinfection plan drawings shall have a scale of 1:500 to 1:1000
- e) Testing plan: **which** shall include
 - i) Sampling locations for chlorine injection points and bacterial test
 - ii) The minimum required field density tests on the bedding zone
 - iii) Pressure test sections for distribution system and forcemain
 - iv) Flow hydrant and residual hydrant locations
 - v) Boundary valve and meter cart locations
 - vi) Bulkhead locations
 - vii) Layers for the watermain, sanitary sewer main, services, lot number, valves, cc valves, blow-offs, and manholes
 - viii) Numbering for manholes, valves, and hydrants
 - ix) Modelled flows for hydrants/blow offs
- f) After the 2nd design drawing submission, any subsequent changes to drawings shall be clouded and numbered with a revision triangle to show any modification that have occurred during the design drawing stage. Revision clouds and triangles shall be removed after written approval is given by Aquatera/City. Drawings will be re-submitted for stamped approval with all clouds and revision triangles removed. All clouding changes shall have their own separate layers in the AutoCAD version of the drawings.
- g) Any modifications following the approval of the design drawings shall be submitted on a redline drawing as required by Aquatera.



- h) The consultant shall return the approved design drawings (hard copy and digital format) to Aquatera within 5 business days of receiving the signed copies from the Municipality.
- i) After construction and within 6 months of issuing the CCC:
 - i) Submit proposed Record Drawings for approval by Aquatera.
 - ii) Submit final approved Record Drawings in PDF and AutoCAD format.
- j) The City of Grande Prairie drafting standards shall also apply to infrastructure installed in Aquatera's service area.
- k) Disinfection plans shall include pipe volumes for flushing.
- l) Ensure the data is represented in model space. Paper space drawings will not be accepted. Plotting layout shall be in paper space.
- m) Include all external references files (xrefs).
- n) Drawing coordinates, rotation and scale must be relative to the geographic coordinates, rotation and scale of the coordinate and projection system as approved by the City of Grande Prairie and County of Grande Prairie (according to the municipal boundary your project boundary is encompassed by). Please refer to the City of Grande Prairie and County of Grande Prairie's Digital Plan Submission Standard Guidelines for their respective geo-reference requirements.

1.2.1 Site Servicing Plans

Are required for all commercial sites. Site servicing plans will be reviewed and approved by Aquatera. It is the responsibility of the owner/applicant/consultant to ensure the contractor is working with the approved drawings.

All site servicing plans shall be 11x17 PDF and digital format (it is recommended to submit professional drawings) and include:

- a) The size & lengths of water and sanitary service lines from property line to the building
- b) Hydrants, valves, blow offs & sanitary manholes
 - Sanitary manholes on site shall only have one vent hole, be F-39 frame and cover and say "sanitary."
- c) A Testing plan is required when multiple water test locations exist and jointed pipe has been used. As per AWWA standards testing shall include: (Note: services 2" and less at minimum require, bacteriological tests and chlorine residuals)
 - a. 5ntu turbidity, Pressure, Chlorination, 2ntu turbidity and bacterial tests



- b. Injection points (within 3m of the boundary/service valve), Sampling locations and Pipe volume calculations for flushing



1.3 Digital Plan Submission Standards And Procedures

Table of Contents

- 1) Digital Plan Submissions
- 2) Requirement for Data Layers
- 3) Requirements for Submissions

Appendixes:

Appendix A – Required Layers

Appendix B – TCA

Appendix C – Object Data Requirements

Appendix D - Linework Checklist



Digital Plan Submissions

This document defines the requirements for submitting Digital Construction Projects to the Aquatera. It covers all phases of a Construction Project that CAD is required, phases includes; design review, final approved design and as-built.

Requirement for Data Layers

The data layers required as part of a digital submission are used for, location validation, discrepancy clarification, and accuracy validation during integration.

Please view the following Appendices for information on appropriate layering. Additional layers may be added if required.

- Appendix A for required layers. These layers MUST be present.
- Appendix B for layer required for the TCA process.
- Appendix C for Object Data requirements
- Appendix D for Linework Checklist.

Requirements for Submissions

1) Submission Package

- a) The files must be contained within a zipped (.zip) file before submitting.
- b) PDF file is the plan of record and must contain all data listed in the plan standards documents and be formatted as described in section "PDF file".
- c) For design review submissions
 - i) PDF – Complete set of design drawings. May be broken by depth for design clarity.
 - ii) Paper copies (24 x36 and 11 x 17 PDF's) of all drawings required.
 - iii) Comments will be marked up on the PDF files and transmitted back.
- d) For Construction drawings
 - i) If at any time changes are required during construction, Aquatera shall be notified and redline drawings shall be submitted as soon as the change is requested. Files shall be submitted in both PDF and AutoCAD prior to requesting a CCC inspection. Aquatera will not schedule CCC inspections if redline drawings and /or approved drawings both AutoCAD and PDF have not been submitted prior to requesting inspections.
 - ii) The AutoCAD Civil 3D file shall accompany the digital record drawing submission. 3D files are for Aquatera internal mapping purposes only and will not be kept on file.
- e) Final Approved Drawings and As-Built (Record) Submissions
 - i) ALL required stamps and signatures must be filled in and documents must be returned to Aquatera Utilities Inc. within 5 days of Aquatera Utilities Inc. signing



- ii) Paper copies (24 x36) of all PDFs required
- iii) PDF – Complete set of design drawings. May be broken by depth for design clarity.
- iv) AutoCAD DWG containing all CAD work.
- v) The AutoCAD Civil 3D file shall accompany the digital record drawing submission. 3D files are for Aquatera internal mapping purposes only and will not be kept on file.

2) File Formats and Specifications

a) Naming Files - All files are to be named as follows:

- i) Project_code.dwg
- ii) Project_code.pdf
- iii) Project_code.zip

*Note: If drawing files are submitted as separate files for either AutoCad or PDF format, all files shall be named as their respectful drawing titles as shown on the drawing sets cover page. Ex) Municipal Overall, Disinfection plan, etc.

b) PDF file

- i) PDF file is the plan of record and must contain all data listed in the plan standards documents. PDF files should be created from vector files or layout view to obtain the best clarity. If your process differs, the PDF should be a Group IV, 300 dpi or higher resolution.
- ii) The PDF file must not contain coloured linework or fill/shading. Linework must be black (grey tones, fuzzy linework and fill/shading will not be accepted).
- iii) The plan must not be more than 25 inches in width or 36 inches in length. No plan shall be smaller than 11 inches in width or 17 inches in length.
- iv) A margin outline 1 cm from the edge of the plan is to be drawn around all sides of the plan. Large white areas outside of the plan margin must be cropped out
- v) The Alberta Land Surveyor must use and sign the Sustainable Resource Development affidavit, which references the *Surveys Act*, for all survey plans.
- vi) The 1, 2, 3, 4 and 5 scales (i.e. 1:1, 1:2, 1:3, 1:4, 1:5) National Standard of Canada scales must be adhered to. Plans in a scale smaller than 1:10 000 are only acceptable for CNT and PNT applications or as authorized by the department. Details may be shown in any scale.
- vii) The disposition extent boundary must be identical in the PDF and CAD or Shape files.



c) CAD files:

- i) Drawing (CAD) file .dwg must be geo-referenced and structured according to the layer and content requirements in the appropriate Appendix. Autodesk AutoCAD .DWG files must be version 2010 or newer.
- ii) Layering Requirements are in the Appendixes and each required layer/levels must exist and be named correctly even if there is no data.
- iii) All layers pertaining to Aquatera infrastructure must be turned on and unfrozen within the submitted drawings.

d) Geo-referencing - Surveys

- i) CAD file must be geo-referenced to and prepared on the NAD83 (Original) or NAD83 (CSRS) datum. Identify the geo-referencing point in the CAD file.
- ii) It is preferred that the geo-referenced coordinate be derived from a survey control marker (Provincial or Federal); however, they can also be tied to ATS v4.1 or to an autonomous Global Navigation Satellite System (GNSS) position via NRCan's Precise Point Positioning (PPP). The actual observed position rather than the published coordinates of any other survey monuments (not the geo-referenced point) should be shown or listed.

**** Note: The following indicates the priorities for geo-referencing the CAD file related to the Reference Point and the Orientation Point.**

e) Prioritized Selection Criteria for Reference Point

- i) Canadian Base Network, High Precision Network Survey Control (ASCM NAD83 (CSRS) subset or GNSS (i.e., GPS) base station(s) that have been formally designate as ASCM(s).
- ii) ASCM or PPP (see www.geod.nrcan.gc.ca/products-produits/ppp_e.php) ATS v4.1

If the above coordinate system in point e) is not used, the below in point f) shall be adhered to:

f) Non-Surveys

- i) CAD file must include a start point and orientation point. The digital plan must be provided in NAD83 coordinates, geo-referenced to the v4.1 March 2005, ATS coordinate file. The geo-referencing point must be indicated in the CAD file. All linework in the file is to be represented on the proper mapping plane (UTM).



3) Submissions

All required information may be submitted through a file server or copied to a USB stick, burned to a CD or DVD and delivered to Aquatera.

4) Quality Assurance

- i) If the submitted package does not meet the requirements, it will be rejected with the requirements that it be corrected and resubmitted. Be aware that layer name capitalization and spelling may be grounds for rejection.
- ii) All drawing revision boxes shall be updated each time a revision is complete. In the case where there are no more revision boxes in the drawings, the revision with the oldest date shall be removed and the current revision with the most recent date will be added. Drawing sets that do not have the revisions boxes correctly updated will be rejected.



Appendix A – Required Layers

These MUST be present in some version of the examples below.

Layer required in ALL dwg files.

Layers labeled as _TEXT are not required IF the appropriate data can be extracted from the object data and displayed on the drawing in a format that can be printed

Layer Name Examples	Type	Layer Description	Surveyed	Object Data Required	TCA
EXT_DVL	Point	Contains the linework of adjacent Existing property, r/w and surface activities/dispositions as indicated per content requirements for that disposition. Typically outside area of interest. ATS (section) linework broken for plot purposes.	Yes		Yes
EXT_DVL_TXT	TEXT	Contains the text for Existing adjacent surface activities /dispositions, property and r/w.	No		
ATS_GRD		Alberta Township System linework must be complete for the entirety of all 1/4 sections affected by the surface activity.	Yes		Yes
ATS_GRD_TXT	Text	Text for Alberta Township System Grid	No		
GEO_REF_PNT	Point	Establishing Reference points	Yes	Yes	
GEO_REF_PNT_TXT	Text	Labels for Geo-reference points			
PROJ_BND	Poly	The boundary line of the subdivision or property. It must be bold enough to eliminate any possible confusion and not be dashed.	Yes	Yes Hectares	Yes
PROJ_BND_TXT	Text	Project (Development) Name	No		yes



Appendix B – TCA Layers

These are layers required for the TCA process. **BARRELS BIGGER THAN 1200 S BE SPECIFIED**

All Items shall be on their respective layers.

Water Layer

<i>Layer Name Examples</i>	<i>Type</i>	<i>Layer Description</i>	<i>Surveyed</i>	<i>Object Data Required</i>	<i>TCA</i>
HYD	Point	Location of fire hydrants	Yes	Yes	Yes
HYD_TXT	Text	Text Associated with FIRE_HYDRANT layer	No		Yes
FR_PND	POLY	Fire Pond Location	Yes the point of hydrant location		
FR_PND_TXT	TEXT	Text associated with Fire Ponds	No		
TRK_F_PT	Point	Location of truck fill locations, not Fire Hydrants	Yes		Yes
TRK_F_PT_TXT	Text		No		
WAT_MAIN	Line	Water lines built as part of the subdivision/project.	Yes	Yes	Yes
WAT_MAIN_TXT	Text	Text associated with Water Line			yes
WAT_VLV	Point	Water valves Location	Yes	Yes	Yes
WAT_VLV_TXT	Text	Text associated with Water Valve (Type, Size, etc)	No		Yes
WAT_NOD_LOC	Point	Pipe nodes	Yes		Yes
PMP_STA	Point	Represents the centermost point of a pump station Yes	Yes		Yes
PMP_STA_TXT	Text	Text associated with Pump Station	No		Yes
CC_VLV	Point	Water Service Curb Stop Location	Yes		Yes
CC_VLV_TXT	Text	Text associated with CC Valve	No		Yes
BLW_OFF	Point	Blow Off	Yes		Yes
BLW_OFF_TXT	Text	Text associated with Blow Off	No		Yes



Sanitary Sewer Layer

<i>Layer Name Examples</i>	<i>Type</i>	<i>Layer Description</i>	<i>Surveyed</i>	<i>Object Data Required</i>	<i>TCA</i>
SA_MAIN	Line	Sanitary Sewer lines built as part of the Subdivision/project.	Yes	Yes	Yes
SA_MAIN_TXT	Text	Text associated with the SEWER_LINE layer	No		Yes
SA_MH	Block	Sewer Manholes	Yes	Yes	Yes
SA_MH_TXT	Text	Text associated with the San Sewer Man layer	No		Yes
SA_CO	Block	Sanitary Sewer Clean outs	Yes		Yes
SA_CO_TXT	Text	Text associated with the San Sewer Clean Outs	No		
SA_NOD	Block	Sanitary Sewer Nodes	No		Yes
SA_NOD_TXT	Text	Sanitary Sewer Node text documentation	No		Yes
SA_SER	Line	Sanitary Services built as part of the Subdivision/project.	Yes	Yes	Yes
SA_SER_TXT	Text	Text associated with the Sanitary Services	No		Yes
SA_SER_CO	Block	Sanitary Services built as part of the Subdivision/project.	Yes		Yes
SA_SER_CO_TXT	Text	Text associated with the Sanitary Services	No		Yes
SA_SER_VLV	Block	Sanitary Service Valve built as part of the Subdivision/project.	Yes	Yes	Yes
SA_SER_VLV_TXT	Text	Text associated with the Sanitary Services Valve	No		Yes

Appendix C – Object Data Requirements

Object data (attribute data) is used to facilitate the flow of information from CAD into GIS and other database applications with a minimum of duplication of effort. The relevant information is stored in a table format attached to the objects that can then flow seamlessly into other applications. As a result, table structure is very important and changes to the format cannot be made.

Appropriate data will be attached to the linework and/or points as object data. Appropriate data includes, but is not limited to:

- Flow Rate
- Volumes
- Sizes (Diameter, Length)
- Install Date (Day, Month Year)
- Capacity
- Caveats
- Pipe Type (PVC, HDPE, Concrete)
- Manholes, Rim, Inlets/Outlets, inverts, Frame & Cover
- Valve Sizes (optional at this time)



Appendix D – Linework Requirements

Checklist for Linework

- Each Layer must be separated into the major layers
- Text must not exist on the same layers as linework.
- Text layers may contain leaders and arrows.
- Linework is not to be duplicated.
- This linework must be topologically clean, no duplicated linework and no dangles or undershoots.
- Linework not to be broken and must be topologically clean.
- Existing development may be included as an X-ref or as separate line work.