THE CITY OF AIRDRIE GENERAL DESIGN STANDARDS & CONSTRUCTION SPECIFICATIONS
(by ENGINEERING SERVICES)

November 2017
Final Revision
Prior to commencement of any work, all approvals must be in place. This includes but is not limited to: Development Permits; Subdivision Servicing Agreement; Engineering Services Approval and Safety Code requirements. Furthermore, the contractor is also responsible for giving notification within the timeframe outlined by each agency.

Services
City Hall.................................................................403-948-8800
Engineering Services..............................................403-948-8835
Planning.................................................................403-948-8848
Public Works.........................................................403-948-8415
Parks.......................................................................403-948-8400
Building Inspections..............................................403-948-8833
Municipal Enforcement.........................................403-948-8892
Economic Development.........................................403-948-8844

Field Location Service Calls
Alberta One Call (Cellular*3447)..............................1-800-242-3447
Shaw Cable............................................................403-716-6060

Emergency Services
If you accidentally damage the coating, scrape, sever, or rupture any underground or above ground utilities, please report the incident immediately.

Engineering Services..............................................403-948-8835
Public Works.........................................................403-948-8415
Public Works (After Hours).................................403-948-8415

Emergency Calls
Alberta First Call (Cellular *3447)..............................1-800-242-3447

Public Works (After Hours)...................................403-948-8415
Fortis Alberta Inc..................................................403-310-WIRE (9473)
TELUS 611
ATCO Gas.............................................................1-800-511-3447
RCMP (911 – Emergency Calls Only).......................403-945-7267
Shaw Cable............................................................403-716-6060
Scope

These specifications form part of a contract document for construction and development within the City of Airdrie. The primary focus of these specifications is to ensure that standard sets of overall performance objectives are realized for design and construction within the City. All work performed within the City of Airdrie, shall be carried out in accordance with the latest issue of the “City of Airdrie General Design Standards and Construction Specifications”. The City reserves the right to vary the standards to meet any site issue that may arise in order to update the City’s development standards and protect public interest. As a result, specific site specifications may be applied where Engineering Services deems it to be necessary. All deviations from these specifications and approved construction drawings shall have the written approval of Engineering Services. In these specifications, the term Engineering Services shall mean the City of Airdrie Engineer Services Team Leader or his authorized representative. All development and construction issues not addressed within these specifications shall fall under the scope of the current “City of Calgary Standard Specifications” unless otherwise specified.

Good Engineering Standards

Engineering Services may modify the General Design Standards and Construction Specifications from time to time; or at any time by written notice to the developer if, in the reasonably held view of Engineering Services, the General Design Standards and Construction Standards no longer remain consistent with good engineering practice.

Notwithstanding anything contained in this document, all designs shall meet the statutory requirements of the environmental protection policies adopted by the elected Council of the City of Airdrie.
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1. LOCAL IMPROVEMENTS

Local Improvements as defined within the Subdivision Servicing Agreement shall be installed, where applicable, by the Developer at the Developer’s cost. “Local Improvements” shall mean and include:

1. Water distribution mains, including all fittings, valves and hydrants and required appurtenances;
2. Sanitary sewer gravity mains, including all manholes and required appurtenances;
3. Storm sewer gravity mains, including all manholes, catch basins, catch basin leads and required appurtenances;
4. Service connections from the storm sewer, sanitary sewer and water mains to the required location referenced from property line; except in the case of industrial, commercial, mobile home parks, church and multi-unit lots and parcels; 
   For exceptions only, please refer to the “City of Airdrie Application for Development Permit”
5. Streets and roads with a stabilized base course and asphalt concrete surface;
6. Concrete curbs and gutters, concrete swales throughout the completed subdivision;
7. Concrete sidewalks and walkways of construction materials approved by the City;
8. Lanes and alleys, graveled and/or paved;
9. Street lighting and shallow utilities including, underground power, gas and telecommunications (phone, cable, fiber);
10. Landscaping of boulevards and medians, including areas between curbs and separate sidewalks to the property line and other public lands;
11. Park, pathway, and walkway development on dedicated lands in accordance with Plans approved by the City;
12. Sound attenuation fence or screen fence
13. Traffic control signage, street signs and line marking;
14. Traffic control signals and controlled pedestrian crossings where required;
15. Overland drainage control facilities, storm water ponds and related structures;
16. Other improvements that are described in the Subdivision Servicing Agreement.
2. STANDARDS AND REQUIREMENTS

2.1 Design and Construction

City of Airdrie General Design Standards and Construction Specifications (current addition) shall be followed unless otherwise approved or required by Engineering Services. All exceptions to the City of Calgary specifications are outlined within this document. Engineering Services reserves the right to not accept any City of Calgary specification at the sole discretion of the Municipal Representative. These standards and specifications are intended to be the minimum standards. Where conditions dictate and good engineering practice requires, higher standards than those indicated shall be incorporated into the design. It shall be the Developer’s responsibility to develop the subdivision or property in accordance with standards, which conform to good engineering and construction practices, and as approved by the City of Airdrie.

Subdivisions shall be designed:

1. In accordance with an approved NSP (Neighborhood Structure Plan) or Concept Plan for the subdivision showing an overall proposal for development of un-subdivided lands; and/or
2. To be integrated with the City’s infrastructure, GIS, drawing standards; and
3. To be referenced to the North American Datum 3TM (NAD83); and
4. To suit the use for which it is intended; and
5. To accommodate any possible future subdivision of adjacent lands; and
6. Lot areas shall be in conformity with the City of Airdrie Land Use Bylaw No. B-09/2005 or as amended. Design work must be in accordance with the City of Airdrie Municipal Development Plan (MDP) (where appropriate). The City encourages and will show flexibility to accommodate alternative standards to promote conservation, sustainable best practice, and unique and innovative neighborhood design when done in the context of the MDP.
2.2 Cross Sections

1. Highway Arterial
2. Arterial
3. Primary Collector
4. Collector
5. Local

- In the case of alternate road standards, the conceptual line assignments and road design cross sections shall be submitted to the City for approval at the NSP stage, prior to starting the detailed design.
- In general, it is recommended that the line assignments be submitted to the City for approval at the start of a tentative subdivision application prior to detailed design.

2.3 Line Assignments

The City of Airdrie has developed line assignment diagrams (refer to Appendix 1). When designing the line assignments for a development the following shall be taken into consideration for deep utilities:

1. Minimum lateral spacing is 2.5m between water and sewer utilities. The spacing requirement may be increased at the discretion of Engineering Services when the depth of bury is deemed to be excessive.

2. Sanitary Sewer mains shall be aligned at the crown (center) of the roadway where possible. In the event of an inverted crown, cross fall, or lane, the sanitary sewer shall not be located near the lowest elevation in the cross section to minimize infiltration.

3. Unless otherwise approved by Engineering Services, right of way sizes for municipal utilities shall be a minimum of 9m for a single non sleeved main. If the utility is to be sleeved, the right of way may be 6m in width. For each additional utility in either a sleeved or non-sleeved right of way, add 3m to its width. For example, a right of way containing non sleeved water and sanitary mains would be 9m plus 3m for a total width of 12m. Utilities that are excessively deep may also require wider right of ways.
2.4 Engineering Drawing Standards

2.4.1 Engineering Drawing Submission

All engineering drawings shall be prepared under the supervision of and sealed by a Professional Engineer (P.Eng) or a Professional Technologist (P.Tech) registered in the Province of Alberta. Detailed Engineering Drawings shall be submitted to the City of Airdrie for review and approval for all developments. New subdivision developments require a complete set of construction drawings that include cover sheets for all relevant local improvements and appropriate block profiles. Each set of drawings shall include (unless otherwise approved):

1. Oversize and boundary improvements clearly defined;
2. Proposed Land Use Classification map indicating the classification of all lots within the Development Area;
3. Neighborhood Structure Plan (NSP)
4. Location of all test holes with logs;
5. Location of all existing utilities and other improvements within or immediately adjacent to the Development area;
6. Registered or non-registered legal plan, easements and utility right-of-way plan;
7. Existing contour plan;
8. Watermain layout - to show all lines, valves, fittings, line sizes, classification or type, bedding classification, pressure control facilities, pressure zone contours and park services;
9. Sanitary sewer layout - to show all lines, line sizes, classification or type, bedding classification, manholes, lengths, slopes, invert and rim elevations, and direction of flow;
10. Storm sewer layout - to show all lines, line sizes, classification or type, bedding classification, manholes, lengths, slopes, invert and rim elevations, drainage area boundaries, catchment areas, outfalls, catch basins, and direction of flow;
11. Sidewalks, curb & gutter, roads & walkways layout - to show all curb, gutter and sidewalk proposed as to type and location, radii, catch basins, carriage way and right-of-way widths, proposed roadway design sections for asphalt (lifts), crushed gravel, pit-run gravel, proposed walkways;
12. Building grade plan - to show all surface drainage swales and elevation, lot corner elevation, sanitary and storm invert elevations at property, lowest top of footing grades, landscaping building grades, terracing details, retaining wall locations, seasonally adjusted water table contours (0.5 m interval); by legend, lots which require bearing certificate, connection of weep tile to storm, setback variation from standard, test hole locations, restriction of housing type due to grades, lot type (level, w/o, split, etc.), lot number, 1:100 flood contour line, ice jam level, size and type of water, storm, sanitary service;

13. Landscape grade plan as per “City of Airdrie Standard Landscape Guidelines and Specifications”;

14. Overland drainage plan;

15. Storm water management plan;

16. Erosion & Sediment control plan;

17. Signage and line marking Plan;

18. Plan Profiles;

**2.4.2 Engineering Drawing Submission**

Submissions include but are not limited to:

1. Drawings are to be signed and sealed to ensure a detailed review has been undertaken by the responsible engineer of record prior to submission.

2. **Preliminary Construction Drawings:** Overall Servicing Plans which shall be submitted for preliminary approval at a scale of 1:1000 unless authorized otherwise by Engineering Services, showing work to be constructed, the area considered, and an insert site location plan at a scale not less than 1:2500. The Engineering consultant shall submit one (1) full size hard copy and a pdf version of the preliminary construction drawings.

3. **Final Construction Drawings:** Upon receiving comments and/or approval of the Preliminary Construction Drawings from the City of Airdrie, the Engineering consultant shall submit One (1) full size set, two (2) 11x17 sets, and a CAD version. All drawings to be scalable.

4. **Shallow Utility Drawings:** Each utility company shall submit a digital drawing submission for each shallow utility line assignment application.

5. **Plan Profile Drawings:** Submitted at a scale of 1:500 horizontally and 1:50 vertically for water mains, sanitary sewer, storm sewers, services, roads and lighting. The geometric layout and dimensions of all above noted utilities including lanes, walkways and lots shall be shown clearly on the plan portion of the drawing. The profile section shall show the existing ground profile along centerline and the proposed design street grades, and...
proposed sanitary sewer, storm sewer, and water main grade. These plans are to accompany both the Preliminary and Final Construction Drawings.

6. **Site Servicing Plan (Mechanical Site Plan):** Overall Servicing Plan that shall be submitted for approval at a scale of 1:500 unless otherwise authorized by Engineering Services, showing a detailed design of the servicing and storm water management if required for a Development Permit. The Engineering consultant shall submit three (3) copies of this plan.

7. **As-Built Drawings (Drawings of Record):** Prior to, or in conjunction with any Construction Completion Certificate (CCC) applications, the consulting Engineer shall deliver the complete set of “as-built” original paper prints for review. As Built submission will be received by the City within 90 days of the CCC application. Upon receiving comments and/or approval of the “as-built” drawing set, profiles in digital format are to be submitted (see section 2.5 for digital submission requirements). Maintenance periods will be extended for improvements for which as built drawings are not received by the City within 90 days.

**As-Built Drawings for CCC submission**

1. Cover Sheets (surface, water, sanitary storm)
2. Building Grade Plan
3. Storm Drainage Area

**As-Built Drawings for FAC submission**

1. Plan Profiles
2. Storm Pond (cross sections, profiles contours)

8. **Development Permits:** All site developments (private, commercial, industrial and multi-family residential sites) must complete an Application for Development Permit and provide all drawings/plans as indicated. Please contact the Planning Team for more information. An As-Built submission of the site servicing plan will be required prior to DCC Inspection request. All As-Built submissions will adhere to the requirements of section 2.5 (Digital Submission).

### 2.5 Digital Submission

The City of Airdrie requires all plans and drawings to be submitted in most current edition of AutoCAD (contact Engineering Services for current edition). The coordinate system of all digital submissions must be **3TM, NAD83**. Each utility must have an individual layer that includes no other information. Separate layers for each utility is required for text, manholes, valves, reducers, elbows, etc. All drafting must exhibit proper connectivity of line work as well as a break in the line at manholes, valves, reducers, tees and fittings. All drawings must be topologically correct.
AutoCAD Files will:

1. Include the City of Airdrie logo;
2. Bind all x-refs;
3. Include pen settings/plot file;
4. Have excess title blocks cut off (or on a separate layer that is shut off); 5. have no “future utility” reference (or on a separate layer that is shut off).

Consultants and Developers are required:

1. Use the “City of Calgary Standards Block Profile Specifications” (current edition)
2. to contact Engineering Services for existing infrastructure information

Digital drawings must be submitted such that all x-ref’s, plot styles, photos, jpegs, pdf’s, etc. and any other relevant information for viewing and printing of both the cover sheet drawings and the profile drawings are included. The digital drawings shall be provided such that they can be opened, viewed, and printed without any modifications or set-up requirements to the drawings by the City. All layers and information that are unrelated shall be removed from the digital drawings prior to submission.

1. The digital files for the above listed submissions must be included with final submissions.
2. The City will accept submission by CD-ROM or USB.
3. The City uses AutoCAD (current edition).

2.6 Compaction Testing

Compaction testing shall be performed during construction for: all areas requiring fill; the backfill of any trenches; road base preparation; base preparation for any concrete placing at CCC/FAC (sidewalks, curbs, gutters, drainage swales, etc); pathway and walkway installation; and any other areas that may be specified. The compaction testing, monitoring, and reporting shall be performed by a qualified geotechnical engineer in accordance with the “City of Calgary Standard Specifications Roads Construction” (current edition).

2.7 Supporting Documents for CCC

Following the completion of construction of the local improvement(s), the Consultant may apply for Construction Completion Certificates. Please refer to the “City of Airdrie CCC Checklist” (refer to Appendix 2) for a complete list of submittal requirements. Incomplete submissions will be returned to the Consultant.
2.8 Supporting Documents for FAC

Following the required maintenance period, the Consultant may apply for Final Acceptance of the local improvement(s). Please refer to the “City of Airdrie FAC Checklist” (refer to Appendix 3) for a complete list of submittal requirements. Incomplete submissions will be returned to the Consultant.

2.9 Maintenance Periods

The required Maintenance Periods for each local improvement are noted on Schedule “D” (refer to Appendix 4)

2.10 Traffic Accommodation Strategy (TAS)

Traffic control for construction (i.e. road work, underground services, lane closures, etc.) and all related activities shall be in accordance with the “Alberta Transportation, Traffic Accommodation in Work Zones” (current edition) or the “City of Calgary “Temporary Traffic Control Manual” (current edition). Any work on or beside a public road; will require submission of a traffic accommodation plan to the Engineering Services prior to construction for review. Engineering Services must accept the TAS and the contractor must provide 72-hour notice before the implementation of any traffic accommodation strategy once it has been approved. Refer to www.airdrie.ca for a complete list of requirements.

2.11 Stripping and Grading

Only the Development Area shall be stripped and rough graded.

Prior to the commencement of stripping and rough grading of the Development Area, the Developer shall submit for approval by the following items:

1. two (2) copies of the cut and fill plans identifying those areas with more than two meters of fill;
2. a Deep Fills Report for those areas being filled more than two meters deep, containing recommendations on any development restrictions, including but not limited to bearing certificates, special foundation designs, that may be necessary to ensure the integrity of any structure constructed on fill areas, including but not limited to buildings, roads and utilities;
3. two (2) copies of an Erosion and Sediment Control Report;
4. A letter from the Developer stating that all affected utility companies have been contacted regarding the relocation or disposition of that utility;
5. plans showing details of edge conditions and/or backsloping requirements and areas to be reloaded, seeded and maintained until natural conditions occur;
6. a list identifying the owners of all lands adjacent to the proposed stripping and grading area and provide written documentation from the affected adjacent property owners giving permission to access such lands (when applicable and required), including City owned rights-of-way used for backsloping or other purposes and where the stripping and grading boundary abuts other property owners, cross sections must be submitted; a plan showing the location where stripped loam will be stock piled, the location of which shall be outlined in green on the plan attached to the Erosion and Sediment Control Report;

7. a letter from the Parks and/or the School Board affected (where applicable) approving the location of the loam stock pile on a Municipal Reserve, School Reserve or Municipal/School Reserve site, as contemplated in the Municipal Government Act, and outlining any conditions that may be required; and

8. a letter from the City of Airdrie Engineering Services Department approving the stockpiling of loam on interchange areas, or grading adjacent to existing or proposed roadways, and outlining other required conditions.

9. install all erosion and sediment control features, which shall be inspected, maintained and repaired regularly and as necessary, in accordance with the Erosion and Sediment Control Report and to the satisfaction of the City of Airdrie Engineering Services Department;

10. ensure that water trucks are on site with sufficient frequency to control dust within the Development Area to the satisfaction of the City of Airdrie Engineering Services Department;

11. submit a copy of the approval by the Province of Alberta for any stripping and grading encroachments within Alberta Infrastructure and Transportation Highway Corridor;

12. notify the individual appointed by the City of Airdrie Engineering Services Department twenty four (24) hours in advance of commencing the stripping and grading operations and arrange a site meeting with the Consulting Engineer and Contractor;

13. where applicable, erect fencing and provide other measures satisfactory to the City of Airdrie Engineering Services Department to ensure the stripping and grading does not encroach into any land designated as Environmental Reserve;

14. the developer, at its sole cost and expense, shall erect “Private Property” and “No Trespassing” signs on the perimeter of the Lands, stating the Developer’s name and the phone number of a representative.

15. Any and all loam stock pile(s) created in connection with the stripping and grading of the Development Area shall be neat in appearance, free from any hazardous condition, treated to prevent soil erosion from wind and rainfall, be posted with signs prohibiting dumping and designating the Lands as “Private Property”, “No Trespassing” and “No Unauthorized Personnel Beyond this Point”, all to the satisfaction of the Engineering Services; and
Once stripping and grading has commenced

1. Details of loam stock piles including height, width, length and volume shall be submitted to the City of Airdrie Engineering Services Department

2. The Developer shall be responsible for controlling noxious weeds as contemplated in the Weed Control Act, RSA 2000, c.W-5, as amended.

3. Any and all loam stock pile(s) created in connection with the stripping and grading shall be removed by the Completion Date, unless an extension of time is granted in writing by the City of Airdrie Engineering Services Department prior to the said date; and
   a. Extension applications must be requested in writing thirty (30) days prior to the Completion Date of this Agreement or the request will be automatically denied and removal procedures will be initiated.

4. No grading, filling or excavation is permitted within utility and road rights-of-way, under any overhead utility lines, or over any underground utilities, unless prior written authorization has been obtained from the utility agencies or City Departments concerned.

5. The Developer shall submit modifications to the Erosion and Sediment Control Drainage Plans and Erosion and Sediment Control Report that may be necessary from time to time for various reasons, including but not limited to development of portions of the Development Area or adjacent lands, or drainage and/or erosion control facilities that may require rerouting or redesigning.

6. The Developer, at its sole cost and expense, before, during and after the stripping and grading and development of the Development Area, shall fulfill the obligations contained in the City Specifications regarding the control and disposal of all storm water in and from the Development Area and storm water which may be cut off from its natural drainage route by the development, including but not limited to inlet protection to any adjacent storm water sewer system.

7. The Developer shall employ appropriate measures in accordance with but not limited to the requirements contained in both the "Erosion and Sediment Control Report and the City of Calgary Guidelines for Erosion and Sediment Control", as amended and replaced from time to time, best management practices and to the satisfaction of the City of Airdrie Engineering Services Department to control any dust, particularly in the vicinity of highways or occupied dwellings, to ensure traffic safety and minimize dust nuisance complaints from the public, and to minimize drainage, soil erosion, soil instability and other problems arising from stripping, rough grading, associated loam stock pile and all operations related thereto.

8. If during stripping and grading operations or any other construction within the Development Area, the applicant, owner of the development site, or any of their agents or contractors become aware of any contamination:
   a. The Developer shall ensure that any person discovering such contamination shall forthwith report the contamination to Alberta Environmental Protection, Calgary Health Region and the City Manager.
b. The Developer, prior to the release of any building permits, shall submit a Phase 2 Environmental Site Assessment acceptable to Alberta Environmental Protection, Calgary Health Region and the City Manager.

c. If required to do so by Alberta Environmental Protection or Calgary Health Region or the City Manager, the applicant shall submit to Alberta Environmental Protection or Calgary Health Region or the City Manager, a remediation plan or risk management plan (Phase 3 ESA), acceptable to Alberta Environmental Protection or Calgary Health Region or the City Manager.

9. Before the City’s Planning Department provides a clearance letter to the City’s Building Inspections Department to facilitate the release of Building Permits, the Developer shall submit to the City of Airdrie Engineering Services Department, a letter, in a form satisfactory to the Manager, Engineering Services and Public Works, certifying that the physical components identified in the Phase 3 ESA have been installed.

10. If the Developer encroaches into the adjacent land during the stripping and grading of the Development Area, the Developer, at its sole expense, shall rehabilitate the adjacent lands to the satisfaction of the adjacent land owners immediately after cessation of use of the adjacent land.

11. The Developer, at its sole cost and expense, and to the satisfaction of the City of Airdrie Engineering Services Department, shall rehabilitate in a timely manner any offsite areas or operations, storm water runoff, soil erosion, soil instability, sedimentation, dust or other problems which may arise from the stripping and grading, and shall employ the use of gravel pads to curb dirt, mud or other debris from being tracked out onto any streets located within and adjacent to the Development Area and reduce or stop activity when the site has excessive dust emissions in the sole opinion of the City of Airdrie Engineering Services Department.

12. Stripping and Rough Grading Compaction Report shall be submitted by the Consulting Engineer to the City of Airdrie Engineering Services Department certifying that rough grading is in compliance as set out in the Consulting Engineer’s Field Services Guidelines.

13. The Developer shall provide written notification to the City of Airdrie Engineering Services Department that all septic systems, including but not limited to fields, tanks and water wells located within the Development Area have been decommissioned to the satisfaction of the City of Airdrie Engineering Services Department and that the impacted areas have been rehabilitated and are suitable for the intended use.

14. In the event that any septic systems, including but not limited to fields and tanks and water wells, located within the Development Area have not been decommissioned, the Developer shall provide written notification to the City of Airdrie Engineering Services Department indicating why they have not been decommissioned and when they will be decommissioned in the future.
15. Large hauling operations of fill material on/off site require a Road Use agreement between the City and the Developer/contractor. This agreement requires, but is not limited to:
   a. Haul route map
   b. TAS
   c. Pre/post inspection with Engineering Services
   d. Securities in the form of a LOC

16. The developer shall pay a fee to the City to replace any or all survey control stations/markers that have been destroyed or damaged due to the development of the area. The replacement charges, per survey controls station, are as follows:
   a. 1st Order (Deep Bench Mark) $10,000.00
   b. High Precision Network Marker (H.P.N.) $7,500.00
3. WATER DISTRIBUTION SYSTEM

3.1 Design

Water distribution facilities including water mains, valves, hydrants, and service connections shall be provided by the Developer. Engineering drawings showing detailed design of the necessary work shall be submitted to and approved by Engineering Services prior to commencement of construction. The drawings shall show alignment and size of pipes, material, classification, location and details of all fittings, valves and hydrants, service connections and all other details as may be required.

The water distribution system shall be adequate to supply the peak hourly demands or the peak daily demands plus fire flows, whichever is greater. Fire flow requirements shall be as recommended by the Insurer's Advisory Organization of Canada. In addition, the City may require a pressure distribution analysis. Water mains shall be looped wherever possible.

These drawings shall show alignment and size of pipes, pipe classification, bedding classification, proposed grades, distances between manholes, manhole invert elevations, existing ground line, proposed final ground line, location of all service connections to the property line, all easements, and all other such details as specified in section 2.3 (Engineering Drawing Standards).

Please refer to the “City of Calgary Standard Specifications for Waterworks Construction” (current edition) for detailed specifications. The following are City of Airdrie requirements that may differ from the City of Calgary:

3.2 Water Mains

1. Main sizes may be increased by the City as considered necessary. Mains shall be located within streets, lanes, or utility right-of-ways wherever possible.

2. Any water system or part of a system must be designed to serve not only the area within the development boundary, but also any area that requires a contributing flow from the system. The City of Airdrie will pay for oversizing, please refer to the SSA for detailed information.

3. Once the mainline is pressurized, mainline valves are to be operated in accordance with current Waterworks Bylaw.
3.3 Preliminary Flushing of Water Mains

1. When flushing through a hydrant the number of steamed outlets to be used shall be as listed below or at the approval of the Water Services Department:

<table>
<thead>
<tr>
<th>Pipe size (mm)</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp. Connections</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

3.4 Hydrants

1. Acceptable Hydrants
   a. Brigadier M67 (Including Heritage style5
   b. ¼" main valve opening
   c. Hose Outlets - AMA 2.987" 8TPI,
   d. Steamer Outlet - Seagrave - 6.112" - 4TPI,
   e. Operating nut size and shape – 1 ¼” square,
   f. Outlet nut size and shape - 1 ¼” square.

2. All Hydrants shall be painted with epoxy paint Lime Green with Black caps and top.

3. All Hydrants shall be supplied with a break feature at ground line.

4. Metal bollards may be required to safeguard the fire hydrant from vehicle damage, as specified by Engineering Services.

5. Refer to “City of Airdrie standard line assignment” for hydrant and valve placement locations.

6. Base flange will be installed 50 mm above finished grade. The 150mm port (front or steamer outlet) must face directly to the Fire Department pump operating area. A 2-metre clearance is required on the port sides of the hydrants and 1 meter clearance on the back or blank side. This area must contain no obstruction that could hamper visibility of the hydrant from the road, within a 3-metre radius.

7. After installation, each hydrant shall be tested for proper operation and flow. Upon completion of the tests, the Consulting Engineer shall forward a "Hydrant Certificate" to the City Fire Chief, stating the test data (date, time, pressure and flow results) and that the hydrant has been tested and is now in operation. No testing shall be carried out without Public Works staff being present. The City shall be given at least two full working days’ notice prior to the testing being undertaken.

8. The use of fire hydrants is detailed in City of Airdrie Bylaw B30/2016.

3.5 Bulk Water Stations

1. Bulk water stations are available for all Contractors for construction purposes.
2. The locations of the stations may change. A map of current locations can be found on the website by searching “Bulk Water”.

3. An account is required to fill from the bulk water stations. An account can be setup from the Utilities Department.

3.6 Valves

1. If there is a benefit or an increased reliability of service, Engineering Services may require additional valves other than those outlined by City of Calgary specifications. Valves on distribution mains are to be located at the extension of the street property line at street intersections. Valves are required on all hydrant leads. Valves installed in the City of Airdrie differ from City of Calgary specifications in the following ways:
   a. All valves shall turn counterclockwise to open.
   b. The top nut shall be 50mm (2 inches) square.
   c. No valves will be installed in City of Airdrie owned sidewalks (full or partial).
   d. Please refer to City of Airdrie Drawing W0001 (refer to Appendix 5).

2. Once the mainline is pressurized, valve operation is to be undertaken only by a City of Airdrie employee who is a certified operator in accordance with the current Waterworks Bylaw.

3.7 Service Connections

1. Where service connections tie into a water main that is not PVC, an isolating full wrap clamp/saddle (Robar or approved alternate) must be used for all service sizes.

2. It is the responsibility of the Developer to remove all unused or abandoned service connections resulting from the development. The service must be completely removed from the main and repaired with an approved repair clamp. This includes any temporary connections in new main installation used for construction purposes only. Tapping the main for temporary construction use (such as for chlorine injection) shall be avoided whenever possible.

3. Do not cut stem on or below the ‘S’ curve on the rod within curb stops.

4. All PEX services that are not perpendicular from the main to the curb stop must be installed complete with tracer wire from curb stop to main stop.

5. All service connections shall be installed via HotTap
   • 50mm diameter and smaller to the City of Calgary specifications
   • Larger than 50mm by approved City of Airdrie contractor. Please contact Engineering Services for a list of approved contractors.
6. Services shall be a minimum of 4.0 m from side property lines where shallow utility boxes exist. Mark all service valves with a 2.5 m (8-foot) length of 100 mm x 100 mm (4 x 4) extending 1 m (3+ feet) above the top of finished grade immediately adjacent to the service valve.

7. Duplex or semi-detached lots shall be serviced with separate services.

8. For lots of higher density use, individual services shall be provided where individual titles can be created. Each service shall be labeled to the corresponding address and installed in a sequential order matching the house number orientation, other than condominium units.

### 3.8 Hydrostatic Testing

City of Calgary Hydrostatic Pressure Testing and Disinfecting Procedures shall be followed for all new main installations. **The City of Airdrie shall be given at least two full working days’ notice prior to the testing being undertaken** in accordance with the current Waterworks Bylaw, the Developer shall not operate any existing water valves. Should any test disclose leakage greater than the allowable, the Contractor shall, at his own expense, locate and repair the defect. Any failed test attempt must be rescheduled with at least two full working days’ notice. The contractor is responsible for collecting the clean water sample(s) and arranging for analysis. The main may not be put into service until the water sample results have been forwarded to and accepted by the City.
4. WASTEWATER & DRAINAGE SYSTEMS

4.1 Design

Sanitary and Storm sewer facilities including gravity mains, pump stations and force mains (if required), manholes, catch basins, culverts, inlet and outlet structures, service connections, lot drainage systems and all other related appurtenances shall be provided by the Developer. Engineering drawings showing detailed design of the necessary works shall be submitted to Engineering Services for approval prior to commencement of any construction.

These drawings shall show alignment and size of pipes, pipe classification, bedding classification, proposed grades, distances between manholes, manhole invert elevations, existing ground line, proposed final ground line, location of all service connections to the property line, all easements, and all other such details as specified in section 2.3 (Engineering Drawing Standards).

4.2 Sanitary Sewer

The sanitary sewage collection system shall be designed using the “City of Calgary Subdivision Design Guidelines” (current edition).

4.2.1 Sanitary Sewer Construction

Please refer to the “City of Calgary Standard Specifications for Sewer Construction” (current edition) for detailed specifications.

1. Sanitary Plugs
   a. At the commencement of a new phase of underground construction, the Consultant is required to notify Engineering Services.
   b. Upon notification, Engineering will coordinate with Public Works, the Public Works Team will install a sanitary plug in the low end of the new system.
   c. The plug will be remain in place until flushing and CCTV inspection has been completed The plug may not be removed by any person other than a member of the City of Airdrie Water Services Department
   d. Unauthorized removal or tampering with the plug will result in CCTV inspection and flushing of existing mains to the satisfaction of Engineering Services

2. Interior Drop Manhole
   a. Standard unit is the Reliner ®
   b. Please refer to City of Airdrie Drawing S0003 (refer to Appendix 5)

4.3 Storm Sewer

The design of the storm sewer system shall be in accordance with the “Nose Creek Watershed Water Management Plan, section 8.3” (current edition).
NOTE: Should the Report on the Water Table indicate a high level, the Developer may be required to lower the elevation of the storm mains below the water and sanitary mains in order to intercept the flow at clay dams in the other trenches. Please refer to the “City of Calgary Standard Specifications for Sewer Construction” (current edition) for detailed specifications.

4.4 Storm Water Quality

Storm water treatment is a requirement of every development. Best Management Practices shall be used to reduce pollutants at the source and provide storm water treatment as necessary. “Alberta Environmental Protection Storm Water Management Guidelines” and the “City of Calgary Storm Water Management & Design Manual” shall be followed in all cases where practical.

4.5 Sewer Mains

1. The City as considered necessary may increase main sizes. Mains shall be located within the streets, lanes, or utility right-of-ways wherever possible. In addition, improved bedding shall be provided where soil conditions and/or trench load conditions dictate. Insulation will be required for any main that is installed with less than the minimum cover.

4.6 Manholes

1. Manhole covers shall be cast in accordance with City of Calgary specifications; however they shall be cast to read “AIRDRIE SEWER MANHOLE” for both Storm and Sanitary manholes. Please refer to City of Airdrie Drawing S0001 & ST0001 (refer to Appendix 5).

2. Where a sanitary manhole base has a “dead end invert” the dead end will be benched to prevent buildup of solid material. If the dead end is temporary and will be used for future development, benching is not required.

4.7 Inlet Control Device (ICD)

ICD’s are not to be bolted in place.

4.8 Catch Basins

1. Catch Basins will have a slump in the bottom of each unit
   a. Sump will be 250mm in depth, measured from the interior base of the catch basin
   b. Please refer to City of Airdrie Drawing ST0002 in (Appendix 5) for more information.

2. French drains are required at the EOP from the CB to the outer limits of the trap low.

3. Where a Type “C” CB conflicts with a driveway, the City may approve a standard “K2” rolled CB will be installed. The “K2” will have the same inlet capacity as the Type “C”.
4.9 Service Connections

1. All commercial, industrial, and multi-unit developments require a sanitary test manhole. The test manhole must meet all City of Calgary requirements plus the following conditions:
   a. Within the property line boundary
   b. Maintain a 24hour/7day a week accessibility by City of Airdrie employees (Manhole is not to be placed in a through traffic area)
   c. Please refer to City of Airdrie Drawing S0002 (refer to Appendix 5)

2. Use of Insert-Tee on sanitary main lines 200mm and larger is approved. Proper installation techniques must be applied to ensure the “T” is not inserted further than directed by the manufacturer.

3. Surface drainage that may be contaminated from industrial, agricultural, or commercial operations shall not be discharged to the storm sewer. Please refer to the “City of Calgary Development Site Servicing Plan Guidelines” for more information.

4. Connections from roof leaders shall not be made to the storm sewer system, unless approval is received from Engineering Services. Roof drainage from residential housing units, apartments, commercial, and industrial buildings shall discharge to grassed or pervious areas.

4.10 Lot Drainage

Please refer to the “City of Airdrie Lot Grading Bylaw B-34/2007”

4.11 Deflection Testing of Storm and Sanitary Sewers

1. CCTV inspection for CCC shall occur no sooner than 30 days after complete backfill.

2. A detailed report of the CCTV inspection must be submitted along with CCC submission. The report must include;
   a. Consultants notes for each video review
   b. Detailed information of anomalies (pictures, chainage, location) noted within each video review
   c. Declaration of review from the consultant that a detailed review has occurred

3. Short term deflection testing (by mandrel) is not required for CCC submission.

4. CCTV inspection for FAC shall occur no sooner than 1 year after complete backfill.

5. A detailed report of the CCTV inspection must be submitted along with FAC submission. The report must include;
   a. Consultants notes for each video review
   b. Detailed information of anomalies (pictures, chain age, location) noted within each video review
   c. Declaration of review from the consultant that a detailed review has occurred
d. Long term deflection test (by mandrel) of individual lines only where anomalies were noted and deemed necessary

6. Upon review of the FAC CCTV inspection report, Engineering Services may request mandrel testing on any segment of underground utilities detailed in the report.

PLEASE NOTE: Where long-term testing indicates failure, (i.e. vertical deflection in excess of 7.5%) the failed pipe section must be excavated and repaired to the satisfaction of Engineering Services. FAC will not be approved by Engineering Services in these cases, until CCTV and 7.5% mandrel testing are completed in the repaired lines. Deflection test and CCTV review will be required on all repaired lines, once repairs have been completed.
5. IRRIGATION – STORMWATER FOR RE-USE

5.1 Irrigation System Design

The purpose of the Irrigation Supply Line System section in this document is to provide the requirements for irrigation systems where the irrigation supply line system will be located within City of Airdrie roadways and does not consist of supply from the City’s potable water distribution system. This will occur where water for the irrigation system is sourced from storm water ponds and re-used for irrigation purposes.

The following section provides the design and submission requirements for the irrigation supply line system. For items not specified in this section, the following shall apply:

Irrigation Pump Station Design as per section 5.3 of this document
Irrigation Infrastructure as per section 6 of this document

The Irrigation Supply Line System includes irrigation pipes, valves, drains, air release valves, and services. All of the Irrigation Supply Line System components shall be supplied and installed by the Developer.

5.1.1 Preliminary Design

Prior to City approval of the irrigation system, a preliminary design and Master Irrigation Report (MIR) for the development area shall be submitted and approved by Engineering Services. The MIR shall provide sufficient information to confirm that the system will be designed in accordance with these guidelines and will operate effectively both during the various phases of development as well as at ultimate development completion.

The Master Irrigation Report shall be prepared to align with the Master Drainage Plan (MDP). The Irrigation Pump Station Design shall be based on the Master Irrigation Report. The engineer of record shall provide written confirmation that the MIR was considered in preparation of the Master Drainage Plan. The Master Irrigation report will be a separate report submitted to the City and shall be submitted in conjunction with the Pond report for the development.

The Master Irrigation Report and preliminary design drawings shall include:

1. Design assumptions and design criteria;
2. Modeling parameters and analysis of irrigation piping network for each phase of subdivision (confirming pipe size and adequate available pressure). The modelling results shall be included in the appendix of the report;
3. Modeling parameters and analysis of irrigation piping network for entire development area serviced by the irrigation system (confirming pipe size and adequate available pressure);
4. Consider pressure variance within the irrigation infrastructure due to staging and operations;

5. Proposed irrigation schedule (as approved by the Airdrie Parks Department) at a preliminary level including overall water demand for the park and number of hours of operation per week at what flow rate. At the time the each MR is designed in detail as subdivision phases progress, detailed information specific to the MR will need to be provided as per the current Airdrie Irrigation Infrastructure guidelines for Parks;

6. Proposed operations in terms of the number of locations/zones that can be irrigated at a given time (i.e. 50% of the system, 100% of the system, etc.); Assumed demands and resulting pressures at delivery points under proposed operations scenario;

7. General flushing and drainage information and overall winterization/maintenance plan (including estimated compressed air “blow down” flowrates)

8. Consideration for water balance with storm ponds or other source water

9. Confirmation of main line capacity from the applicable irrigation pump station

10. Phasing strategy (main line system, storm water pond volumes, etc.). The phasing strategy must conform to the proposed subdivision staging and identify at each stage how the water balancing needs to be managed to ensure ponds do not exceed high water levels and are adequately drained at each stage while ensuring sufficient water exists for proper irrigation. Additionally, the phasing strategy should consider valve locations and proper sequencing of construction relative to subdivision phasing; and

11. The Master Irrigation Report is to be signed and stamped by a certified Irrigation system designer, registered and in good standing with the Irrigation Association (Canadian Prairie Chapter) or an Engineer.

The preliminary design drawings shall include:

1. An overall coversheet showing main line piping layout (including phasing boundaries) including main lines from the irrigation station, any service lines through MR or other green spaces that are required to facilitate distribution, and all mains and services in the City’s roadways;

2. Coversheet to include proposed valves, blow off valves, drains, services and other required facilities

3. Show all proposed areas that are to be irrigated;

4. Provide the location of the irrigation pump station;

5. Make reference to the Master Drainage Report and Irrigation Pump Station Design as the basis for design in the ‘Notes’ section;
5.1.2 Detailed Design

Subsequent to the approval of the preliminary design, the Master Irrigation Report, and the Irrigation Pump Station design, detailed design drawings will be required for each stage of the subdivision. The detailed design submission for the irrigation system is part of the overall engineering design submission and thus the design drawings and submission shall be provided in accordance with section 2.4, Engineering Design Standards. The irrigation portion of the submission shall include, but is not limited to the following:

1. Irrigation cover sheet drawing; Profile drawings including pipe alignment, depth, length, slope, pipe size, pipe type and rating, bedding information, and stations for all valves, air releases, drain ports, and flushing assemblies

2. Pipe sizes, materials, classifications, slopes and directions, location of all valves/fittings, drain points, flushing locations, air release valves, storm manholes, irrigation controllers, and other details;

3. Details for Park Water Service into MR's, PUL's, and other areas to be irrigated

4. Reference to the Master Drainage Report as the basis for design in the notes’ section.

5.1.3 System Design

The irrigation supply line system is to be installed in the same alignment and directly above the existing storm water mains. Where a storm system does not exist, the irrigation supply lines shall be installed in the same line assignment as if the storm line existed based on the typical road cross sections in (Appendix 1). The alignment is to be within streets, lanes, or utility right-of-ways. Irrigation supply lines shall be located only in Residential, Industrial, or Collector road classifications. Irrigation supply lines shall not be located in roadways classified as Major, Arterial, or Highway Arterial.

The system alignment shall be designed to facilitate gravity drainage of the irrigation lines to the storm system as part of the required winterization maintenance process. Drainage points will be provided from the mains, at a maximum spacing of 300m unless otherwise approved by Engineering Services.

Looped irrigation supply line systems are not required.

If required, any irrigation system or part of a system must be designed to serve not only the area within the development boundary, but also any area that requires a contributing flow from that system.

The minimum Irrigation water supply pressure at the check valve/property line connection to the MR is 415 kPa (60 psi), throughout the main line system; unless irrigation is being supplied to a sports field where the required supply pressure is 485 kPa (70 psi). The maximum supply pressure is 690 kPa (100 psi) unless otherwise approved by the City. Note: supply pressures and rates are subject to an approved Master Irrigation Report and approved Irrigation Pump Station design.
Pipes are to be sized such that main line flows are not to exceed 1.5 m/s (5 ft/s) during peak demands, as detailed in the Master Irrigation Report.

The minimum depth of bury is 800 mm and the maximum depth of bury is 3.0 m. The minimum vertical separation between the irrigation supply line pipe and the top of the storm main shall be 200 mm. Irrigation supply line pipe must be placed below any road structure, and substantially deep to permit H20 live loading above.

Standard roadway cross sections for the irrigation supply line system within road right of ways can be found in (Appendix 1).

5.2 Irrigation Infrastructure Within Road Right of Ways (Irrigation Supply Line)

5.2.1 Pipes

The preferred routing for the irrigation supply line system is within the road right of ways. The City will consider routing through MR’s on a case by case basis. All pipe and fittings for the irrigation supply line system shall be jointless HDPE 4710 or fusible PVC, rated to a minimum pipe pressure rating of 160 psi (series 160). Connections to existing irrigation supply lines shall match the existing pipe.

HDPE used for irrigation systems should be manufactured to meet CSA Standard B137.1 or an approved equivalent.

Fusible PVC should be manufactured to meet CSA Standard B137.3 or an approved equivalent.

Any piping system used shall be capable of handling H20 live loading under proposed shallow bury conditions.

Fittings must meet or exceed the SDR/DR rating of the pipe that they will be connected to and be manufactured to the equivalent standard of the approved piping being connected too.

Installation shall be in accordance with installation standards for waterworks system piping as per the City of Calgary Waterworks Specifications. Operator certifications for each fusing method employed on a project shall be presented for inspection and shall have a date no more than one calendar year previous to be considered valid. Butt fusing shall not commence on site until the Fusing Operator has successfully completed a “Bent Strap” test (as per the Plastics Pipe Institute Handbook) to the satisfaction of the Engineer. Bedding and compaction for the irrigation supply line within the road right of ways shall be as per the recommendations of a geotechnical engineer to ensure compaction above and below the irrigation mainline can be provided.
5.2.2 Services and Service Connections

Services shall be sized to not exceed 1.5 m/s (5 ft/s) flow at peak demand, or as per the table below (whichever is greater). The minimum service size is 50mm:

<table>
<thead>
<tr>
<th>Minimum Nominal Service size (mm)</th>
<th>Maximum Irrigated Site size (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>0.83</td>
</tr>
<tr>
<td>100</td>
<td>3.02</td>
</tr>
<tr>
<td>150</td>
<td>6.79</td>
</tr>
<tr>
<td>200</td>
<td>11.17</td>
</tr>
</tbody>
</table>

Services shall be installed to facilitate winterization maintenance; this could include:

1. Sufficient slope back towards the irrigation supply line main to facilitate drainage. The slope of the stormwater system located below the irrigation supply line system would be considered sufficient.

2. Any other method proposed by the consultant and approved by Engineering Services

Service connections shall be fused connections, using suitable fittings approved by the City and installed as per the manufacturer's specifications.

No cross connection of irrigation and potable water systems is permitted.

5.2.3 Valves

Isolation valves are required on the main line system to allow the system to be isolated for repair, maintenance and operational considerations. Valves are required as follows:

1. A service valve be located on every irrigation service entering an MR, PUL or other green space. Service valves shall conform to City of Airdrie specifications for the size and type of valve. For valves larger than 50mm, gate valves conforming to City of Airdrie Guidelines shall be used with the exception that where HDPE pipe is used the valves will need to be flange by flange to facilitate connection. For smaller services (50mm and less), valves shall be self-draining curb stops;

2. A single flap gate check valve shall be located on every irrigation service entering an MR, PUL or other green space;

3. Isolation valves shall be located on the irrigation supply line system to facilitate drainage or winterization “blow-down”. Valves within the manholes for the main line system shall be flanged;

4. Isolation valves shall be installed at multi-directional junctions to the irrigation main similar to a water distribution system. A three-way junction requires a minimum of two valves and a four-way junction requires a minimum of three valves;
5. A valve shall be installed to permit the installation of new services or additional phases of main line system without shutting down any existing irrigation services;

6. Isolation valves for services or mains smaller than 100mm, shall be service valves and shall conform to Airdrie’s engineering guidelines for water distribution systems;

7. Isolation valves for mains 100mm and larger shall be gate valves and shall conform to Airdrie’s engineering guidelines for water distribution systems with the exception that in order to connect to HDPE the valves will be flange by flange;

8. All valves 100mm and larger are to be installed complete with thrust blocks, anode protection and required supports as required for an equivalent waterworks valve.

Valves installed in the City of Airdrie differ from City of Calgary specifications in the following ways:

1. All valves shall turn counterclockwise to open.

2. The top nut shall be 41.275mm (1 and 5/8 inches) square.

3. No valves will be installed in City of Airdrie owned sidewalks (full or partial). Please refer to City of Airdrie Drawing W0001 (refer to Appendix 5).

5.2.4 Air Release Valves

Air Release valves are to be located at high points to facilitate winterization and filling maintenance of the system. They are to be installed as per Calgary Landscape Construction (current edition), Sheet 53a or installed securely within a storm system manhole completed with isolation valve and 50mm (min) lead, as approved by Engineering Services.

5.2.5 Flushing/Draining Points

Flushing/Draining points are to be connected to the Airdrie storm system.

All drain points are to be 50mm or larger, directed into the storm system and be capable of operation under gravity drainage. Drain points shall be provided using a fused tee located at every manhole to facilitate winterization and maintenance.

5.2.6 Meters

Irrigation meters, if required, shall be as per the Standard Landscape Guidelines and Specifications, City of Airdrie, Parks Department.
5.2.7  Thrust Blocks

Thrust blocking is required for the irrigation supply line system, as per Airdrie and Calgary Waterworks specification. Thrust blocking is required for all changes of direction in piping, reducers, isolation valves and to support all valves.

Installation shall be in accordance with installation standards for waterworks system piping as per the Calgary Waterworks Specifications.

5.2.8  Cased Crossing

Where the irrigation supply line is crossing a roadway where the system does not parallel the stormwater system, the supply line shall be encased, adhering to the carrier and encasement requirements outlined in the Calgary Waterworks Specifications.

5.2.9  Hydrostatic Testing

The City of Airdrie shall be given at least two full working days’ notice prior to the testing being undertaken. The Developer shall not operate any existing water valves.

ASTM Designation F 2164-02 Standard Practice for Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure shall be used for testing of irrigation mains within roadways.

1. Make-up water to be added as needed to maintain the maximum test pressure for a period of 4 hours;

2. Reduce test pressure by 10 psi and monitor for a period of 1 hour;

3. If no visual leakage is observed and the pressure test phase remains steady (within 5% of the test phase pressure) for the 1 hour, the test will be considered a pass;

All hydrostatic tests shall be made only in the presence of the City. The developer shall furnish necessary force pump and all other test equipment. Upon completion of each phase of work, entire system shall be tested and adjusted to meet site requirements.

Pressure testing can be undertaken on the irrigation supply line system if the Irrigation Pump Station is not yet operational. Water supply, pumping, and pressure testing equipment to facilitate the pressure test will be the responsibility of the Developer.

5.2.10  Acceptance

Acceptance of a new irrigation supply line system will follow the current City of Airdrie Construction Completion Certificate (CCC) and Final Acceptance (FAC) process. Inspections will be carried out by the Engineering Department as per water main construction.
5.2.11 Construction Completion Certification (CCC)

Upon completion of construction of the irrigation system, an application for CCC will be required. The CCC application will require submission of:

1. CCC application form based on the template (refer to Appendix 2)
2. Pressure test results;
3. Compaction test results;
4. As-Built Drawings

The developer is required to maintain the system for a minimum of one year which must include:

1. One summer of operation;
2. One fall winterization and shutdown;
3. One spring start-up operation;

All maintenance or repairs required during the maintenance period will be the responsibility of the developer.

5.2.12 Final Acceptance Certificate (FAC)

Upon completion of the maintenance period for the irrigation system, an application for FAC will be required. The FAC application will require submission of:

1. FAC application form based on the template (refer to Appendix 3)

In the event that the irrigation mains are part of a staged irrigation system where the system could not be placed into operation due to the staging, the maintenance obligation for the irrigation system will be the responsibility of the developer up to the time an FAC is approved for the Roads. Just prior to placement of the top lift of asphalt for the roadway, an inspection with the City shall be undertaken and a second pressure test completed to verify the irrigation system has not been compromised. The FAC application for the irrigation in this circumstance shall include a copy of the second pressure test.

5.3 Irrigation Pump Station

5.3.1 Introduction

This section outlines the City of Airdrie’s guidelines for irrigation pump station design, installation and maintenance where storm water is the primary and/or only water source for the irrigation system(s).
The City is aware that new International Codes Council / Canadian Safety Association (ICC/CSA) standards for rainwater harvesting systems are being prepared. When the new standard is published, it should be read in conjunction with this document and the more stringent requirements between the two documents incorporated into any pump station design where stormwater is being used for irrigation purposes.

Until the new ICC/CSA standards are published the City requires that the Guidelines for Canadian Recreational Water Quality Third Edition (April 2012) be used to determine the level of treatment concerning microbiological levels and the water quality conditions needed for optimal ultra violet water treatment systems. There are two levels of exposure or contact, primary and secondary, to natural water bodies that are defined in the Guidelines for Canadian Recreational Water Quality Third Edition (April 2012) as follows.

1. Primary Contact: Activities in which the whole body or the face and trunk are frequently immersed or the face is frequently wetted by spray, and where it is likely that some water will be swallowed (e.g., swimming, surfing, water skiing, whitewater canoeing/rafting/kayaking, windsurfing, subsurface diving).

2. Secondary Contact: Activities in which only the limbs are regularly wetted and in which greater contact (including swallowing water) is unusual (e.g., rowing, sailing, canoe touring, fishing).

There are no secondary contact parameters or limits provided in Guidelines for Canadian Recreational Water Quality document so primary contact values were used to provide reference values for the level of contact with the storm water and treated irrigation water that users of parks and sports facilities are likely to experience.

The water in the storm ponds are intended solely for irrigation purposes so there should be no direct human contact with the water in the ponds. There is the slight possibility of human contact, excluding drinking, with the irrigation water if there has been a recently completed irrigation cycle and some freshly applied irrigation water remains on the park or sports field surfaces or if a person is present on a park or sports surface during an irrigation cycle.

To help the filtration and treatment components of the pump station to work as efficiently as possible the City may implement a fertilizer “no spray zone” around the perimeter of each storm pond to reduce the volume of fertilizer entering the storm ponds. The no spray would extend outward from the high water level into the turf to a recommended distance of 10 meters. The width of the zone may be adjusted according to site conditions.

The City also recommends that aquatic plants be planted along pond shorelines to consume some of the fertilizers that may flow down toward the ponds.

The public has become accustomed to thinking that water coming out of sprinkler systems in an urban setting is potable or safe water. Additionally, the public is not aware that lavender (purple) markings represent a non-potable supply. Therefore it is recommended that signs be posted at all park entrances stating that non-potable water is be used to irrigate the park. The signs’ content should be informational rather warning in nature.
All components of the irrigation system that convey potable water must be labelled as per ASME (ANSI) A13.1-2007 standard or marking as approved by the City. The components include pipe, valves, and fittings. The labelling may be available from the manufacturers or labels that can be attached to the components may be used.

5.3.2 General Requirements

5.3.2.1 Intent

This section shall outline the design and installation requirements for:

1. irrigation pump stations
2. storm water intake, filtration, treatment and conveyance, and
3. storm water testing

5.3.2.2 Terminology

The following terms shall be used throughout this section:

1. “City” shall refer to the City of Airdrie
2. “Consultant” shall refer to the designer and/or engineer as described in that is responsible for completing the design and installation review
3. “Contractor” shall refer to the person or company as described inspection that is responsible for completing the construction, installation and commissioning
4. “Auditor” shall refer to the person or company as described in section 5.3.1 that is responsible for auditing the completed irrigation system(s) installation
5. “Storm water” shall refer to precipitation that is collected and stored for irrigation purposes

5.3.2.3 Quality Assurance

1. Professional Qualifications
   a. Irrigation designers, contractors and auditors shall have the following qualifications. Irrigation system designer shall be a Certified Irrigation Designer – Landscape - Commercial (CID) as certified by the Irrigation Association or approved equivalent. The irrigation system may be designed by one not holding a CID designation if the design is reviewed, approved, stamped and signed by a Certified Irrigation Designer – Landscape - Commercial (CID) as certified by the Irrigation Association or approved equivalent.
   b. All other technologists, technicians etc. engaged in the design work shall be qualified according to the governing body of the appropriate discipline
   c. Irrigation contractor shall be a Certified Irrigation Contractor (CIC) as certified by the Irrigation Association or approved equivalent
d. Irrigation auditor shall be a Certified Landscape Irrigation Auditor (CLIA) as certified by the Irrigation Association or approved equivalent

e. Irrigation designers, contractors and auditors shall maintain their accreditation(s) in good standing according to the requirements of the respective certifying organizations

2. Pump station designer shall be an engineer of the appropriate discipline licensed by their professional association in that discipline and qualified to do the design work

3. Pump house designer shall be an engineer of the appropriate discipline licensed by their professional association in that discipline or City approved equivalent, qualified to do the design work

4. Contractors shall have all necessary qualifications to carry out the installation work

5. All designers, contractors, auditors, technologists, technicians, installers etc. engaged in the design and construction of irrigation pump stations shall be qualified according to the governing body of the appropriate discipline

5.3.2.4 Codes/Standards/Guidelines

All products specified and installed as well as all processes used in the design and construction of the pump station shall conform to all applicable codes, standards and guidelines including but not limited to:

1. National Building Code
2. National Electrical Code
3. National Plumbing Code
4. CSA Standards NEMA
5. ULC

5.3.2.5 Design Criteria

1. The Irrigation Pump Station shall be designed based on the criteria and information contained in the Master Irrigation Report (MIR). The engineer of record shall provide written confirmation that this document was considered in the pump station design.

2. The Irrigation Pump Station design shall include details on any required staging of the pump station to ensure that the pump station operations in both the initial stages and ultimate stages of the overall development are appropriate. Any requirements for staging shall be clearly defined on the drawings or in a separate document outlining when the various stages need to be implemented.
3. Pump station designs shall be drawn according to the City of Airdrie guidelines set out in their engineering guidelines/specifications. Drawings shall conform to required City of Airdrie scale, page size, font type, font size, line type, line weight and include the City of Airdrie logo.

4. Should aeration not be proposed in the overall design, the pump station shall still include accommodation for installation of aeration at a later date if needed. The pond shall have necessary piping installed with plugs at either end to allow for future connection if needed.

5. Detail drawings shall be provided for but not limited to the following as they apply to the pump station design
   a. Pump and Pump Controls
   b. Valves
      i. Control valves
      ii. Isolation valves
      iii. Specialty valves
   c. Sleeves
   d. Pipe bedding
   e. Electrical power cables
   f. Electrical components
      i. Control panels
      ii. Cabinets
      iii. Meters
   g. Aeration systems
      i. Piping
      ii. Compressor(s)Wiring
      iii. Concrete pads
      iv. Housing
      v. Control panel(s)
   h. Filter systems and controls
      i. Mesh filters
      ii. Disc filters
      iii. Media filter
   i. Water treatment systems and controls
      i. Ultra-violet
   j. Pump house
      i. Concrete pad
      ii. Sub-grade structure
      iii. Building structure
   k. Water meter
   l. Wet Well
   m. Intake Pipe
5.3.2.6 Ordinance, Regulations, Permits and Fees

1. The Consultant/Contractor shall obtain and pay for any and all permits and all inspections as required.

2. All local, municipal and provincial codes, rules, and regulations governing or relating to any portion of this work are hereby incorporated into and made apart of these Guidelines. The Consultant shall ensure that their provisions shall be carried out by the Contractor. Anything contained in these Guidelines shall not be construed to conflict with any local, municipal and provincial codes rules and regulations or requirements of the same. However, when these Guidelines call for or describe materials, workmanship or construction of a better quality, higher standard, or larger size than is required by the local, municipal and provincial codes rules and regulations, the provisions of these Guidelines shall take precedence.

5.3.2.7 Specifications and Drawings

1. Drawings shall indicate all offsets, fittings, sleeves, etc., which may be required to allow for the City to review the design and the contractor to construct the work. Design shall include consideration of the structural and finished conditions of all work and plan work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. The work shall be installed in such a manner as to avoid conflicts between piping systems, plantings, utilities and architectural features.

2. All work called for on the Drawings by notes or details shall be furnished and installed.

3. The Consultant/Contractor shall not willfully install any component of the intake, conveyance, pumping, filtration, treatment systems as shown on the Drawings when it is obvious in the field that previously unknown obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in the design. Such obstructions or differences shall be brought to the attention of the Consultant and the City. In the event this notification is not completed, the Consultant/Contractor shall assume full responsibility for any revision necessary. Notations in the Specifications or Drawings prepared by the Consultant should be included to the above effect.

5.3.2.8 Manufacturer's Directions

Manufacturer's directions and detail drawings shall be followed in all cases where the manufacturers of equipment or materials are used in the design.
5.3.2.9 Material List

1. All equipment and materials shall be approved by CSA, ULC, NEMA or other agency acceptable to the City.
   a. The Contractor shall submit a complete material list prior to completing any work for approval by the Consultant and, if desired by the City. Material list shall include the manufacturer, model number and description of all materials and equipment to be used.
   b. The Contractor shall not furnish any equipment or materials, or processes not specified by name in the Guidelines and Drawings. No substitutions will be allowed without prior written acceptance by the City.
   c. Equipment or materials substitutions installed or furnished without prior written acceptance of the City shall be rejected and removed from the site at no expense to the City. Product Substitution

5.3.2.10 Product Substitution

1. To substitute equipment or materials the Consultant/Contractor must apply in writing to the City. The application shall include the following:
   a. Make, model and description of the equipment or material to be substituted
   b. Make, model and description of the substitute equipment or material
   c. Substitute equipment or material manufacturer's data/specification sheets including cost difference
   d. Explanation by the Consultant of why the substitution is necessary

5.3.2.11 Warranty

1. Warranty
   a. A copy of all manufacturer warranties shall be supplied to the City with the Operations and Maintenance Manuals.

2. Construction Completion
   a. The City will issue a Construction Completion Certificate once all work is deemed complete and all manuals and record drawings have been received by the City following completion of City personnel training.
   b. The Construction Completion Certificate for the pump station and all appurtenances shall be completed by the Consultant per the template (refer to Appendix 2).
   c. The Consultant and the Contractor shall ensure the pump station and all its appurtenances are fully operational before applying for the Construction Completion Certificate. Upon the application being submitted, the City will provide a date for the initial inspection with the Consultant and the Contractor to verify all systems are operational.
   d. Upon verification by the City that all systems are operational the City will provide suitable dates for operator training to be provided by the Consultant and the Contractor. This date may be the same as the initial Construction Completion inspection if deemed appropriate by the City, the Consultant and the Contractor.
e. Should the pump station and appurtenances not be ready when the Construction Completion application is made, and the City has attended either the Construction Completion inspection or the training which must be cancelled or rescheduled, the City reserves the right to require the costs for their time be reimbursed for each visit that is deemed non-productive by the City.


g. Upon the Construction Completion Certificate being signed off, the City will commence responsibility for regular operations of the pump station. The Consultant/Contractor will be responsible for maintenance and repairs per item 3 – Maintenance below.

3. Maintenance
   a. The Consultant shall ensure that the Contractor shall, as part of their contract, be responsible for providing all necessary training concerning the operation and maintenance of all pump station components to City personnel.
   b. The Consultant shall ensure that the Contractor is responsible for all maintenance and repairs (except maintenance agreed to be done by the City as part of regular operations) for a period of two (2) years from the date of the Construction Completion Certificate for each pump station and its appurtenances. After the maintenance period, a final inspection will be completed per item 4 – Final Acceptance below.

4. Final Acceptance
   a. The City will Issue a Final Acceptance Certificate when the maintenance period has been completed and all requirements have been met.
   b. The Final Acceptance Certificate for the pump station and all appurtenances shall be completed by the Consultant per the template (refer to Appendix 3).
   c. Upon the application being submitted, the City will provide a date for the final inspection with the Consultant (and the Contractor if necessary) to verify all systems are operational. Any system(s) identified as non-operational or requiring maintenance or repair shall be corrected and another inspection undertaken.

5.3.2.12 Records and As Built/Record Drawings

1. The Consultant shall ensure that the Contractor shall provide and keep up to date a complete "as-built" record set of reproducible prints which shall be corrected daily and show every deviation from the original Guidelines and Drawings and the exact "as-built" locations, sizes and kinds of equipment and materials. This set of drawings shall be kept on the site and shall serve as work progress sheets and be used for preparing the Record Drawings.

2. Before the date of application for Construction Completion, the Contractor shall provide all information to the Consultant for preparation of Record Drawings which will be submitted to the City prior to the Construction Completion application submission.

3. Record Drawings shall be prepared on the electronic copy of the original Drawings in the same scale, font(s), line weights, etc. as the original Drawings.
4. The completed Record Drawing shall include:
   a. Labeled as “Project Name Record Drawing”
   b. All variances to any of the systems from the original design including the detail sheets
   c. Dimensions from two permanent points of reference such as building corners, sidewalk, road intersections or other permanent on-site structure, the location of the following items as applicable:
      i. Outside the pump house
         1. Connection to existing pipe systems
         2. Connection to existing electrical power
         3. Intake pipe and components
         4. Pump(s)
         5. Valves
         6. Pipe/tubing routing
         7. Electrical wiring and cable routing
         8. Wet well
         9. Backwash pit
         10. Irrigation system connection point(s)
         11. Aerator(s)
         12. Other related equipment as directed by the City
      ii. Inside the pump house
         1. Connection to pipe system(s)
         2. Connection to electrical power
         3. Pump(s)
         4. Valves
         5. Wet well
         6. Pipe/tubing routing
         7. Flow meter(s)
         8. Water meter(s)
         9. Conduit
         10. Control Panels
         11. Electrical wiring and cable routing
         12. Filter system(s)
         13. Water treatment system(s)
         14. Other related equipment as directed by the City

5. The Consultant shall deliver one (1) set of the completed Record Drawings as well as the digital CAD files and a set of the Drawings in pdf format to the City no less than 10 days prior to Construction Completion Certification. Delivery of the drawings will not relieve the Consultant of the responsibility of furnishing required information that may be omitted from the Drawings.

6. The Consultant shall ensure the Contractor deliver a copy of all manufacturer warranties to the Consultant.

7. The Consultant shall deliver a copy of all manufacturer warranties (which may be included as part of the Operations and Maintenance manuals) and the Record Drawings to the City 10 days prior to the Construction Completion inspection.
5.3.2.13 Operation and Maintenance Manuals

1. Contractor /Consultant shall prepare and deliver to the City within ten (10) calendar days prior to Construction Completion, two (2) binders along with two (2) data sticks containing the following information:
   a. Index sheet stating Contractor’s address and telephone number, list of equipment with name and addresses of local manufacturer’s representatives
   b. Catalogue and parts sheets for all material and equipment installed
   c. Complete operating and maintenance instructions on all major equipment

2. In addition to the above-mentioned maintenance manuals, the Consultant shall ensure that the Contractor provides the City maintenance personnel with operational training for all equipment systems and show evidence writing within the Operations and Maintenance manuals that this service has been rendered.

3. The City will not undertake general operation of the work and issue Construction Completion Certification until all manuals, Record Drawings and Personnel training have been completed.

5.3.2.14 Maintenance Materials

The Contractor shall supply the following spare materials for maintenance purposes:

1. One (1) complete set of UV components required to carry out a complete service, including, but not limited to, lamps, sleeves and wipers.

2. One (1) set of fuses

3. One (1) mechanical seal for each mechanical seal installed on each pump including spare pump gland and packing

4. One (1) spare set of filter material

The above-mentioned equipment shall be turned over to the City at the time of Construction Completion Certification. Certification will be provided only upon confirmation that the City has received these materials.

5.3.2.15 Site Examination

The Consultant shall visit the site and conduct a site examination prior to submitting the design drawings for review and approval by the City.
5.3.2.16 Product Delivery, Storage and Handling

1. Handling of Pipe and Fittings
   a. The Consultant shall ensure that the Contractor exercises due care in handling, loading, unloading, and storing pipe and fittings to prevent damage to pipe and/or fittings
   b. All pipe shall be transported in a vehicle which allows the length(s) or coils of pipe to lie flat so as not to subject it to undue bending or concentrated external load at any point
   c. All pipe and fittings shall be inspected before installation. Any section of pipe or fitting(s) that displays any of the following characteristics shall be rejected and removed from the site:
      i. Appears to be previously used
      ii. Dented or damaged
      iii. Does not have the necessary Class, Schedule, CSA, ULS stamps
   d. Any pipe or fitting that has been installed and displays any of the following characteristics as described in section 5.3.2.17, item 1.3 above shall be removed, discarded and replaced with new pipe and/or fitting(s).

2. Handling of Equipment and Controls
   a. The Consultant shall ensure that the Contractor exercises due care in handling, loading, unloading, and storing equipment and controls
   b. All equipment and controls shall be transported in a vehicle which allows the equipment and controls to lie flat or vertically so as not to subject the equipment and controls to undue bending or concentrated external load at any point
   c. All equipment and controls shall be inspected before installation. Any equipment and/or control(s) that displays any of the following characteristics shall be rejected and removed from the site:
      i. Appears to be previously used
      ii. Dented or damaged
      iii. Does not have the necessary NEMA, CSA, ULS stamps
   d. Any equipment or control(s) that has been installed and displays any of the following characteristics as described in section 5.3.2.17, item e. above shall be removed, discarded and replaced with new equipment and/or control(s)

5.3.2.17 Field Quality Control and Site Visits

1. The Consultant will visit the site to review the pump station construction as it progresses and coordinate inspections with the City here as required. The number and type of visit will be determined by the Consultant/Engineer in consultation with the City according to the requirements of each project

2. The following are minimum recommended site visits the Consultant should attend. The Consultant shall determine the number of additional site visits required to allow for Construction Completion sign off.
   a. Pre-construction meeting: City may want to attend
   b. Installation of intake pipe and wet well: City may want to witness
   c. Pump house layout review: City may want to attend
d. Installation progress review:
e. Completion of pump house including all filtration, treatment and control systems review:
f. Pipe pressure test review: City, Consultant, and Contractor to attend

3. Required Site Visit After Construction:
   a. City will attend the Construction Completion Site Visit (for Construction Completion Certification) and the Personnel training as per section 1.4.2 Construction Completion.
   b. Required Site Visit Notification:
   c. Contractor/Consultant shall be responsible for notifying the City a minimum of 3 days in advance for any required site visits:

5.3.2.18 Potable Water Source

Potable water source shall be the point of connection with the municipal water supply specified by the City to be used as the backup water supply.

1. Potable water shall be used as a backup water source for irrigation systems that are used to irrigate sports fields and shall be supplied to the irrigation system through the pump station.

2. Where potable water is used as the backup water source the following shall apply:
   a. City of Airdrie Standard Landscape Guidelines & Specifications 2014 section 2.10.a
   b. The Consultant shall apply to the City for a copy of the most current water testing for hardness, iron and manganese.
   c. Potable water shall flow into the wet well and then be supplied to the irrigation system(s) via the pump station
   d. Backflow device(s) conforming to CSA standard B64.10-07/B64.10.1-07 and the National Plumbing Code shall be used to protect the potable water supply.
   e. An isolation valve shall be installed on the pump station intake pipe to prevent potable water flowing from the pump station into the non-potable water source

5.3.2.19 Non-Potable Water Source

1. Only water collected and stored in storm water ponds shall be the source(s) of non-potable water that will be used as in irrigation systems

2. Water samples shall be collected from the storm water ponds for testing by an accredited laboratory

3. Sampling Methodology
   a. Water samples will be collected to determine the water quality
   b. Water sampling schedule will begin with monthly collections during the irrigation season until such time as it is determined that a less frequent collection schedule would be appropriate. (Appendix 6) lists the recommended test parameters and the currently acceptable levels of these substances.
   c. This list may change as government regulations or guidelines are revised
4. Aeration, filtration and treatment systems shall be designed to prepare non-potable water for irrigation use based on the results of the laboratory testing or the values listed in (Appendix 6).

5.3.2.20 Pump Station Design

Pump stations shall be comprised of several sub-systems designed to work together to collectively filter, treat and distribute storm water to the irrigation system(s).

The Pump station shall consist of but not limited to the following components:
1. Pump house
2. Pump station
3. Aeration system(s)
4. Filter system(s)
5. Treatment system(s)

5.3.3 Products

5.3.3.1 General

The Consultant shall specify that Pump Station and Irrigation System shall use only new equipment and materials of brands and types noted on Drawings. All products specified and noted on the Drawings shall meet the requirements set out in the following sections.

5.3.3.2 Pipe and Fittings

1. Pipe and fittings shall be as follows:
   a. High Density Polyethylene (HDPE) pipe shall be DR 11 (160 PSI) or greater
   b. HDPE fittings shall have the same DR rating, or greater, as the pipe used
   c. Polyvinyl Chloride (PVC) pipe shall be SDR 21 (CSA Series 200) or Schedule 40 and conform to CSA B137.3-93
   d. PVC fittings shall be Schedule 40 or 80, 1-2, II-I NSF approved conforming to ASTM test procedure D2466 as appropriate to site conditions
   e. Solvent cement and primer for PVC solvent-weld pipe and fittings shall be of type and installation methods prescribed by the manufacturer
   f. Drainage Pipe shall be single wall corrugated plastic pipe
   g. Drain pipe fittings shall be shall have the same rating as the drain pipe All pipe must bear the following markings:
      i. Manufacturer’s name
      ii. Nominal pipe size □ Schedule/ Class/ SDR/ DR □ Pressure rating in P.S.I.
      iii. Date of extrusion
   h. All fittings shall bear the manufacturer’s name or trademark, material designation, size, applicable I.P.S. schedule and NSF seal of approval
   i. If steel pipe is used in place of HDPE DR11 pipe then the steel pipe shall meet or
2. Threaded Fittings – Riser & Nipples

Threaded risers or nipples shall be constructed of Schedule 80 PVC or galvanized steel.

3. Sleeves

Sleeve material shall be as follows:
   a. Where sleeves pass through concrete floors - PVC pipe SDR 35 or greater
   b. Where sleeves pass building walls - PVC pipe SDR 35 or greater where sleeves pass paths or walkways - PVC pipe CSA Series 200 or greater

4. Conduit

Conduit material shall be as follows:
   a. Of the size and type appropriate to wet environment and underground installation that conform to the appropriate CSA and any other applicable standard
   b. Shall bear the appropriate CSA approval label

5. Electrical Cable

Electrical cable shall be as follows:
   a. Electrical wiring and cabling shall be of the size and type appropriate to wet environment and underground installation that conform to the appropriate Canadian Standards Association and any other applicable standard
   b. All power cables shall bear the appropriate CSA approval label

6. Transformer

Transformers shall be:
   a. Be of the size and type that conform to the appropriate CSA standards
   b. Have input voltage and phase shall match the voltage requirements of the pump(s)
   c. Shall bear the appropriate CSA approval label
   d. Transformer cabinet shall have the appropriate NEMA rating for the installation environment

7. Cabinets & Control Panels

Cabinets and control panels shall meet the following requirements:
   a. Cabinets, control panels, breaker panels, junction panels, transformers shall be moisture-proof and lockable if mounted inside the pump house and weather-proof and lockable if mounted outside of the pump house
   b. Cabinets shall be of the size and type that conform to the applicable CSA standards and have the appropriate NEMA rating
   c. Cabinets shall bear the appropriate CSA and/or NEMA approval label
   d. There shall be sufficient control panels to provide adequate circuits after the transformer
   e. Service receptacles inside pump house (1 per wall)

8. Light Fixtures
Light fixtures shall meet the following requirements:
   a. Light fixtures shall be of the size and type that conform to the applicable CSA standards
   b. Light fixtures shall bear the appropriate CSA approval label
   c. Light fixtures and enclosures shall have IP rating suitable for the pump house environment

9. Miscellaneous Electrical Fixtures

The following is required for miscellaneous electrical:
   a. At least one (1) service receptacle complete with weatherproof covering and elevated mounting shall be provided on the exterior of the pump house
   b. Service receptacles installed inside the pump house shall be fitted with an enclosure suitable for the environment
   c. Service receptacles shall be of the size and type that conform to the applicable CSA standards
   d. Service receptacles shall bear the appropriate CSA approval label

10. Valve Boxes & Reach Wells

The following is required for valve boxes and reach wells:
   a. Valve boxes and reach wells (a reach well is where in ground wire connections, between valve boxes, are located) shall be constructed of HDPE, structural foam polyethylene or polymer concrete and be fitted with a locking lid
   b. Valve boxes shall be large enough to allow disassembling and/or removal of complete components housed within it, through the opening at the top of the valve box without excavating or removing the valve box.
   c. Reach well opening shall be at least twice the diameter of the wire bundle housed within it
   d. Provide valve box/reach well extensions as required to ensure boxes/wells tops are flush with finish grade

11. Water Meter

Water meters shall be of the size noted on the Drawings and of a make and model approved by City

12. Valves

The following specifies the valve types suitable for the pump station:
   a. Valve types shall include but not limited to isolation, drain, pressure regulating, flow restriction and backflow prevention
   b. Isolations valves shall be either of the following types:
      i. Butterfly Valve
         1. Butterfly valves shall be of City approved make and model as specified in the Engineering Guidelines
ii. Gate Valve
   1. Gate valves shall have a minimum pressure rating of 125-lb (861-kPa) SWP bronze gate valve with screw-in bonnet, non-rising steam and solid wedge disc and shall meet City Engineering Guidelines

   c. Drain valves shall meet City Engineering Guidelines
   d. Pressure Regulation Valves
   e. Flow Restriction Valves
   f. Flow restrictor valves shall have the following characteristics:
      i. Sized to match the inlet pipe size of the ultra violet reactors
      ii. Restrict output flow to that required by the ultraviolet reactors to ensure the specified dosage at the input pressure provided by the pump system
      iii. Valve body shall be constructed of lead-free brass or City approved equivalent and shall be fitted with a #20 mesh or finer stainless steel screen

13. Aeration System

Aeration system(s) shall consist of any of the following types of components or combination of components:
   a. Surface spray
   b. Horizontal aspirator/mixer
   c. Air diffuser

Aerators shall be designed and sized appropriately by the system designed to meet the required water quality standards for the treatment system.
Aerator(s) control panel cabinet(s) shall be constructed to NEMA 3R or greater

Diffuser air tubing shall be constructed of weighted, high density, UV resistant PVC pipe all components that will be submerged in water shall be fitted with corrosion resistant casing such as stainless steel or City approved equivalent

14. Intake Screen

Intake screens shall meet the following:
   a. Intake screen shall have the features described below:
      i. Continuous self-cleaning. Self-cleaning method can be accomplished by either a continuously rotating arm located inside the screen and fitted with spray nozzles or a fixed arm located inside the screen and the screen continuously rotating
      ii. #30 mesh, or finer, stainless steel
      iii. Flow-through volume capability at least equal to the required pump station
      iv. Flange mounted
      v. Intake screen shall be installed in a floating frame designed to maintain the intake screen's position approximately 18 inches (0.46 meter) below the pond surface
b. Floating frame shall meet the following criteria
   i. Floats shall be installed inside the framework and be sized to support the weight of the frame, intake screen and associated pipes/hose and fittings
   ii. Constructed of corrosion resistant metal such as aluminum, stainless steel, powder coat painted steel or other material approved by the City
   iii. Top of the frame shall be covered a metal screen that will protect the intake screen from vandalism or accidental damage
   iv. Runners shall be mounted to the bottom of the floating frame 12 inches (0.3 meter) below the bottom of the intake screen to protect the intake screen from damage during winter removal and spring installation and if the water level lowers to the point where the frame would come in contact with the pond bottom

c. Connection to the intake pipe shall be a flexible hose/pipe fitted with flanges at both ends

15. Intake Pipe

Intake pipes shall meet the following:

a. Intake pipe shall be constructed of HDPE DR11 pipe and be sized to permit water to flow through the pipe at a velocity no greater than 1 foot/second (0.3 meters/second) Intake pipe shall be fitted with an appropriately sized isolation valve of a make and model approved by City of Airdrie as described in section 3.5 Valves, in section 3 Water Distribution System. The isolation valve shall be installed on the intake pipe on the storm pond side of and adjacent to the overflow pipe.

b. Intake pipe shall penetrate the wet well wall at or below the elevation of the intake pipe screen and shall be no lower than the length of the pump plus 18 inches (0.46 meters) above the wet well floor.

c. An approved gasket and/or caulking compound shall be used to provide a watertight seal at the penetration point.

d. The inlet end of the intake pipe shall be installed at an elevation in the storm pond, in either a horizontal or vertical position so that the intake screen shall be located with 3.3ft (1m) of the pond surface and supported by a corrosion resistant metal stand constructed of aluminum, stainless steel, powder coat painted steel or other material approved by the City

e. The inlet end of the intake pipe shall have a flange fitting installed that will facilitate connecting the flexible hose/pipe connection between the intake screen and the intake pipe to the intake pipe

16. Wet Well & Overflow Pipe

The wet well shall meet the following:

a. Wet well shall be placed in a location under the floor of the pump house such that:
   i. If a self-contained vertical turbine pump is used, the pump, motor, and other components can be placed above the wet well with adequate space around the station components to allow for service and maintenance to be carried out unencumbered.
ii. If a submersible pump(s) is used the shaft cover shall be a lockable, hinged steel plate sized to overhang the edges of the shaft by 1" (25mm) - 3" (75mm). The cover shall be shaped to fit around or allow piping and fittings to pass through the cover and still allow the cover to be opened and closed securely. There shall be no gap between the cover and the pump house floor.

iii. There shall be no gap between the top of the wet well and the underside of the pump house floor. An approved gasket and/or caulking compound shall be placed between the top wet well segment and the pump house floor to provide a watertight seal.

b. Wet well shall be constructed of concrete and shall either be pre-engineered pre-cast structures or cast in place concrete as designed and stamped by a professional engineer.

c. The wet well/slab shall sit level on a bed of compacted crushed gravel mix. The gravel bed shall have minimum thickness of 6" (150mm), but is subject to geotechnical confirmation by the Consultant. Drawings detailing the structural foundation requirements shall be stamped by the Consultant.

d. Overflow

i. An overflow pipe of the same size and type as the intake pipe shall be installed at the top of the wet well so that it penetrates the wet well wall at a point so that the top of the overflow pipe is 18" (457.2mm) below the pump house floor and connect to the intake pipe upstream of the intake pipe isolation valve.

ii. Overflow pipe shall be connected to the intake pipe using an HDPE DR11 Tee fitting.

iii. An approved gasket and/or caulking compound shall be used to provide a watertight seal at the penetration point.

iv. An appropriately sized isolation valve of a make and model approved by City as described in section 3 Water Distribution System, item 3.5 Valves, shall be installed on the overflow pipe no closer than 4ft (1.2m) from the pump house.

17. Pump(s) & Controls

Pumps and controls shall be as follows:

a. Pump(s)

i. Pump(s) shall be sized to meet or exceed the following flow requirements simultaneously at the required pressure, without infringing on the Service Factor, at the irrigation system(s) connection point(s):

1. Required irrigation system flow
2. Intake screen backflush flow
3. Filtration system(s) backflush

ii. Duplex pump system shall be employed with each pump or set of pumps being capable of supply the full flow requirements of the irrigation system(s)

iii. Pump(s) shall be of either submersible or vertical turbine configuration

iv. Pump(s) shall have the following features

1. Minimum efficiency of 65% at rated flow
2. Preferred voltage of 600 VAC 3 phase
3. Minimum motor voltage of 240 VAC 3 phase
4. Flow sleeve
5. Low water level shutdown capability
6. High water level shutdown capability

18. Filtration Systems

The filtration system shall meet the following:

a. Filtration system shall include either disc or media or a combination of disc and media filtration methods as deemed appropriate by site conditions
b. Filtration systems shall be automatically self-cleaning
c. Disc filtration system(s) shall have the following characteristics:
   i. Equipped with a back-flush controller with the following characteristics:
      1. Powder coated, lockable metal cabinet o Input voltage shall be 110-120 VAC o Output voltage shall be 24 VAC
      2. Capable of operating up to 3 stations plus master valve
      3. Backwash count capable of being reset o Back flush cycle shall be actuated by pressure differential with the options of manual or periodic actuation
d. Constructed of UV protected polypropylene or City approved equivalent
e. Operating voltage - 24 VAC
f. Multiple disc filters that together shall meet or exceed the flow requirements of the irrigation system(s)
g. Minimum filtration Level of 200 mesh or 75 micron
h. Maximum operating pressure equal to greater than the discharge pressure the pump system
i. Pressure loss at pump full discharge flow – <1 psi
j. Media Filtration System
   i. Media filtration system(s) shall have the following characteristics:
      1. One (1) or more tanks as dictated by site conditions
      2. Where multiple tanks are used they shall be installed in parallel
      3. Each tank shall be fitted with an isolation valve on the inlet and discharge pipes
      4. Each tank equipped with a back-flush control system
      5. Tank(s) shall have the following characteristics:
         a. Constructed of fiberglass composite with virgin polyethylene liner or City approved equivalent
         b. Filtration Media: sand or City approved equivalent
         c. Filtration Level: 2 – 7 micron
d. Service Flow or combined service flow equal to or greater than the irrigation system(s) requirement(s)
e. Service Pressure: equal to or greater than the static pressure of the pump system

Backflow prevention is required and shall be installed as follows:
   a. Backflow prevention shall be installed at the point where the potable water make-up system connects to the municipal potable water supply and where the potable water make-up system connects to the wet well
   b. Municipal Potable Water Connection
      i. A double check valve assembly (DCVA) conforming to CSA standard B64.10-07/B64.10.1-07 and the National Plumbing Code shall be installed on the potable water make-up system pipe at the connection point with the municipal potable water supply
   c. Wet Well Connection
      i. An air gap conforming to the National Plumbing shall be installed between the potable water make-up system and the wet well

20. Ultra Violet System

The UV system shall meet the following requirements:
   a. The ultra violet system shall have the following characteristics:
      i. Provide minimum UV dosage of 30 mJ/ cm² @ 95% UVT based on the flow requirements for the pump station
      ii. When multiple ultra violet units are to be used then ultra violet units shall be mounted in parallel
      iii. Each reactor shall be fitted with an isolation valve on the inlet and discharge pipes
   b. Chamber: Stainless Steel
   c. Lamp Sleeve: quartz
   d. Input voltage: 120 VAC at 50 - 60 Hz
   e. Operating pressure: 10 psi – pump system discharge pressure
   f. Ambient air temperature: 32° F (0° C) - 104° F (40° C)
   g. Ambient water temperature: 32° F (0° C) - 104° F (40° C) Maximum water hardness: <= 120 ppm (7 grains/gallon)
   h. Maximum iron content: <= 0.3 ppm
   i. Minimum UVT: 75%
   j. Installation orientation: vertical
   k. Colour coded plug and play connections
   l. Audible alarm
   m. Alarm mute button
   n. Cooling fan/valve
   o. Fan operation indicator
   p. Lamp reset button
   q. Lamp age indicator
   r. Lamp operation indicator
   s. Power supply operation indicator
   t. Solenoid operation indicator
   u. Sensor reading output
21. Pump House

The pump house shall be designed as follows:
   a. Pump house shall be either wood frame or steel construction mounted on a concrete slab
   b. Pump house architectural features shall conform to that of the surrounding area
   c. Pump house framing dimensions shall match the outside dimensions of the concrete slab so the external sheathing can overlap the edge of the concrete slab without coming contact with the ground
   d. Pump house roof will be fitted with a hatch large enough to allow the passage of the largest component of the system that can be readily removed/isolated
   e. Wood frame pump house shall be constructed as follows:
      f. Conform to part 9 of the building code
      g. 2x6 frame construction
      h. Roof trusses shall be engineered
      i. Shall have proper ventilation and doors
      j. Engineer stamped Drawings to be provided
      k. Concrete slab for pump house shall be designed by a structural engineer and Drawings provided.

22. Backwash Pit

The backwash pit shall meet the following requirements:
   a. Backwash pit shall be a drain rock filled excavation whose volume shall be large enough to hold the combined one day flow of all the filtration systems and the pump house floor drain until the water can soak away into the neighboring soil.
   b. Backwash pit shall be lined on all sides with geotextile material to permit water to soak away into the neighboring soils and prevent the neighboring soils from entering the pit
   c. Top of the backwash pit shall be flush with the finished grade

23. Miscellaneous Installation Materials

   a. HDPE pipe couplings and other appurtenances shall be of make and type approved by manufacturer(s) of the pipe and fittings Solvent cement and primers for solvent weld joints shall be of make and type approved by manufacturer(s) of pipe and fittings. Cement shall be maintained at proper consistency throughout use.
   b. Threaded fittings connections shall be sealed as described below:
      i. For movable components such as swing the threaded fittings shall be sealed using Teflon tape sufficient to prevent leakage AND allow movement of the components
      ii. For fixed components the threaded fittings shall be sealed using Teflon tape AND liquid Teflon sealer

24. Miscellaneous Equipment

Provide all equipment called for on the by Drawing
25. Drain Rock & Gravel Bedding

Drain rock for the pump station shall be non-fractured rock, 100% passing a 1-1/2-inch (38-mm) square sieve and 0 percent passing a 3/4-inch (19-mm) sieve.

26. Gravel Bedding

Bedding gravel for the pump station shall be non-fractured rock and sand mix, 100% passing a 3/4-inch (19-mm) square sieve and 0 percent passing a 1/4-inch (4-mm) sieve.

5.3.4 Execution

5.3.4.1 Preparation

1. Site Review The Consultant shall visit the site prior to commencing work to determine the following:
   a. Location of all services, system, etc. that will be connected with in the completion of the work
   b. Location of all services, systems, rights-of-way, easements etc. That may affect or delay the completion of work
   c. The Consultant will notify the City, in writing, of any discrepancies or points of concern and recommended solutions.

2. Physical Layout
   a. Prior to installation, Consultant/Contractor shall stake out the pump house and wet well including all sleeves, pipes, wet well intake pipe, isolation valve(s), valve box(es) and other component locations. The City should attend a pre-construction meeting with the Consultant and Contractor to review staked locations.
   b. Consultant/Contractor can make minor changes to conform to ground conditions. Changes to be noted on Contractor’s as-built Drawings.

5.3.4.2 Potable Water Sampling

1. Sampling Methodology
   a. If the City is unable to provide a copy of the most current water testing for hardness, iron and manganese then the Consultant shall, with the written permission of the City, collect and test water sample at a location closest to the pump station location.
   b. The water samples shall be tested for hardness and, if there is the possibility that iron, manganese levels in the potable water that may affect ultra violet treatment system(s) operation then the potable water samples shall be tested for these substances.
5.3.4.3 Non-Potable Water Sampling

Sampling Methodology

1. The initial set of water samples shall be collected as follows:
   a. Minimum of one set of samples shall be taken within 15ft (4.572m) of each stormwater outfall that supplies water to the storm pond no less than 8 inches (20cm) and no deeper than 3 ft (0.91m) below the water surface.
   b. Minimum of one set of samples shall be taken along the shoreline approximately half way between stormwater outfalls no less than 8 inches (20cm) and no deeper than 3 ft (0.91m) below the water surface.
   c. Minimum of one set of samples shall be taken within 10ft (3.048m) of the pump intake and at the depth of the intake

2. If it is not feasible to collect water samples prior to the pump station construction then the filtration system(s) shall be designed to meet the required level of filtration based on the values in (Appendix 6).

5.3.4.4 Installation

1. Utility Crossing
   a. Expose utilities pipelines or cables using hydro-vac or by hand
   b. The Consultant may adjustment utility crossing location(s), if necessary, in consultation with City

2. Electrical Supply
   a. Consultant shall ensure that the Contractor obtains all necessary permits required for electrical connections for pumps and pump controls
   b. All electrical connections shall be done by a qualified electrician
   c. All electrical components shall be installed per NMS and CEC
      i. Confirm total electrical power requirements of all pump station components using surge values where available. Components shall include but not limited to: Pump(s)
      ii. Pump Control(s)
      iii. Disc Filtration System(s)
      iv. Media Filtration System(s)
      v. Ultra Violet System(s)
      vi. Light Fixture(s)

3. Components
   a. The Consultant may adjust component locations to compensate for site conditions ONLY in consultation with the City and with the written permission of the City
   b. Pipe and pipe fittings shall be of the types described in section 5.3.3.2, item 2 Above and of the sizes shown on the Drawing and installed as shown on the drawing. If the pipe(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.
      i. Underground Installation
         1. Pipe shall be installed to depths necessary to achieve minimum cover of 15 inches (380 mm)
2. Pipe shall be installed using either trenching or “pulling” methods at the Consultant’s discretion. Using either method the Consultant must ensure the pipe is not stretched or damaged in any way during the installation.

3. Thrust blocks shall be installed to support PVC pipe fittings in trenches where the fitting causes the pipe to change direction by 11 degrees or greater.

4. Where thrust blocks are to be installed, all loose material shall be removed from the trench wall so the thrust block shall rest against undisturbed sub soil.

5. Thrust blocks shall be constructed of concrete.

   ii. Inside Pump House Installation

   1. Pipes and fittings shall be installed according to local codes and standards.

   c. Threaded fittings, nipples and risers materials shall be as described in section 2.

      i. Threaded fitting connections that may be subject to movement, such as swing joints, shall be sealed using a sufficient quantity of Teflon tape to ensure the connections are water-tight and will allow the connection to move as required.

      ii. All other threaded fitting connections shall be sealed using a sufficient quantity of Teflon tape and a thin layer of liquid Teflon sealant to ensure the connections are water-tight.

   d. Sleeve material shall be installed as shown on the Drawing. If the sleeve(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

      i. Sleeve(s) shall have a diameter at least 2 times the diameter of the pipe or other objects that it shall house.

      ii. Sleeve(s) shall protrude at least 2” (50mm) above the finished concrete.

      iii. Sleeve(s) shall protrude at least 2” (50mm) in from the finished interior wall.

   e. Conduit material shall be installed as shown on the Drawing(s) and according to local codes and standards. If the conduit(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

   f. Electrical cable and wiring shall be installed as shown on the Drawing and according to local codes and standards. If the cable(s) or wiring location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

   g. Transformer shall be installed as shown on the Drawing and according to local codes and standards.

      i. Transformer shall be install with adequate clearance from walls and at least 4” (100mm) above the building floor or at a height specified by the electrical code, whichever is higher.

      ii. If the location of the transformer must be adjusted, the Consultant shall ensure the new location shall not conflict with any other electrical or mechanical components and the new location shall be noted on the as-built Drawing.

   h. Cabinets and control panels shall be as described in section 25.3.3.2, item 6 and shall be installed as shown on the Drawing and according to local codes and standards. If the cabinet(s) or control panel(s) location must be adjusted, the
Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

i. Light fixtures shall be installed as shown on the Drawing and according to local codes and standards
   i. Light fixture control shall be installed on the inside wall of the pump house beside the entry door according to the applicable electrical code and local codes
   ii. If the light fixture(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

j. Miscellaneous electrical fixtures shall be installed as shown on the Drawing and according to local codes and standards. If the conduit(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

k. Valve boxes and reach wells shall be installed as shown on the Drawing. If valve box(es) or reach well(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.
   i. Valve boxes and reach wells shall be installed on concrete blocks which in turn shall rest on a compacted bed of gravel (bedding gravel for the is described in section 2.26) at least 4” (100 mm) deep and in accordance with the Detail Drawing

l. Water meter(s) meter shall be installed at the locations shown on the Drawing. If the water meter(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

m. Valves shall be installed as shown on the Drawing
   i. Valves that are installed in-ground shall be installed in correctly sized valve boxes as described in section 5.3.3.2
   ii. Valves installed in-ground shall be supported by a concrete block, or poured concrete support, adequately sized to support the weight of the isolation valve and ensure there is no strain on the fittings connection the isolation valve to the pipe
   iii. Valves installed inside the pump house shall be supported by concrete blocks, or metal supports, adequately sized to support the weight of the isolation valve and ensure there is no strain on the fittings connection the isolation valve to the pipe.

n. Aeration system(s) shall be installed as shown on the Drawing. If the aerator(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

o. Intake Screen shall be installed as shown on the Drawing. If the intake screen location must be adjusted, the Consultant shall ensure that the Contractor notes new location shall be noted on the as-built Drawing.

p. Intake Pipe shall be installed as shown on the Drawing. If the intake pipe location must be adjusted, the Consultant shall ensure that the Contractor notes new location shall be noted on the as-built Drawing.
   i. The excavation and trench to install the intake pipe and connect it to the wet well shall be excavated in accordance with the excavation and trenching section on the following pages and all provincial and local safety codes.
ii. Backfill material shall conform to the backfilling section on the following pages.

iii. The trench and excavation backfill material shall be compacted to 95% of the compaction of the surrounding undisturbed material.

q. Wet well and overflow pipe shall be installed as shown on the Drawing. If the wet well and/or overflow pipe location must be adjusted, the Consultant shall ensure that the Contractor notes new location shall be noted on the as-built Drawing.

i. The excavation and trench to install the wet well and overflow pipe shall be excavated in accordance with the excavation and trenching section on the following pages and all provincial and local safety codes.

ii. Backfill material shall conform to the backfilling section on the following pages. The trench and excavation backfill material shall be compacted to as per the geotechnical consultant’s recommendation’s.

r. Pump(s) and controls shall be installed as shown on the Drawing. The Consultant shall make necessary placement adjustments to ensure there is adequate space around each of the components for servicing. If the pump(s) and/or control(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

s. Filtration system(s) shall be installed as shown on the Drawing. The Consultant shall make necessary placement adjustments to ensure there is adequate space around each of the filtration system(s) components for servicing. If the component(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

i. The backflush cycles shall be configured to run automatically. The backflush discharge pipe shall empty into the backwash pit or into the stormwater pond.

t. Backflow prevention shall be installed as shown on the Drawings. The Consultant shall make necessary placement adjustments to ensure there is adequate space around each of the components for testing and servicing. If the backflow preventer(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

u. Ultra violet system(s) shall be installed as shown on the Drawings. The Consultant shall make necessary placement adjustments to ensure there is adequate space around each of the components for servicing. If the ultra violet system component(s) location must be adjusted, the Consultant shall ensure that the Contractor notes new location(s) shall be noted on the as-built Drawing.

v. Pump house shall be installed at the location shown on the Drawing and in accordance with the Engineered Drawings.

w. Backwash pit shall be installed as shown on the Drawings. Drain rock shall be as described in section 2.26.

x. Miscellaneous equipment shall be installed at the location shown on the Drawings in accordance with the manufacturer’s recommendations.

i. All miscellaneous equipment that is to be installed inside the wet well, or other locations where the equipment will be regularly submerged in water, shall be manufactured of stainless steel, brass or other City approved non-corrodng materials.
5.3.4.5 **Excavation and Trenching**

1. Excavation shall be, in all cases, ample in size to permit the pipes to be laid at the intended elevations and to permit ample space for joining.

2. Trench shall be deep enough to provide 15 inches (380mm) minimum cover from finish grade.

3. Restore surfaces, existing underground installations, etc., damaged or cut as a result of excavations, to original conditions in manner approved by the City.

4. Where other utilities interfere with irrigation trenching and pipe work, adjust the trench depth or location as instructed by the City.

5.3.4.6 **Backfilling**

1. Backfill material for the pump station shall be as per section 5.3.3.2, items 25 and 26.

2. Place backfill materials in 6 inch (150-mm) layers and compacted to a minimum compaction of 95 percent of original soil density or as recommended by a geotechnical engineer.

3. Dress off areas to finish grades and remove excess soil, rocks or debris remaining after backfill work is completed.

4. If settlement occurs at excavations or along trenches, the Consultant shall ensure that the Contractor corrects for the settling and adjusts valves, soil, sod, or paving to the proper level or the final grade.

5.3.4.7 **Pipe**

1. Use pipe as specified in this document or as indicated on Drawing. Install in accordance with industry standards and manufacturer's recommendations. Connect HDPE piping using butt fusion method. Allow connection to “cure” at least twenty-four (24) hours.

2. Connect PVC piping using the appropriate primer and solvent cement. Allow connection to “cure” at least twenty-four (24) hours.

3. Paint all galvanized pipe below grade with one heavy coat of approved paint to prevent corrosion.

4. Cap or plug openings as pipeline is assembled to prevent entrance of dirt or obstruction. Remove caps or plugs only when necessary to continue assembly.

5. Where pipes pass through sleeves, provide removable non-decaying plug at ends of sleeve to prevent entrance of earth.
5.3.4.8 Winterizing of Pump Station Appurtenances

1. The winterizing procedures, in the Operations and Maintenance manuals, for the pump station, filtration system(s), ultra violet system(s) and all other related systems will be followed.

2. Winterizing will take place early enough in the autumn that there will be no risk of ice damage to any of the system(s) components.

3. The City requires that the first winterization be completed as part of the regular Maintenance by the Contractor.

5.3.4.9 Spring Start up of Pump and Appurtenances

1. The start up procedures, in the Operations and Maintenance manuals, for the pump station, filtration system(s), ultra violet system(s) and all other related systems will be followed.

2. The spring startup will take place late enough in the spring that there will be no risk of freezing or ice damage to any of the system(s) components.

3. The City requires that the first spring startup be completed as part of the regular Maintenance by the Contractor.

5.3.4.10 Existing Trees

1. Where it is necessary to excavate adjacent to existing trees, the Consultant shall ensure that the Contractor shall use all possible care to avoid injury to trees and tree roots.

2. Excavation in areas where 2 inches (50 mm) and larger roots occur shall be done by hand.

3. All roots 2 inches (50 mm) and larger in diameter directly in the path of pipe or conduit, shall be tunneled under and shall be heavily wrapped with burlap, to prevent scarring or excessive drying.

4. Where a ditching machine is run close to trees having roots smaller than 2 inches (50 mm) in diameter, the wall of the trench adjacent to the tree shall be hand trimmed, making clean cuts through.

5. Trenches adjacent to trees shall be closed within 24 hours; and, where this is not possible, the side of the adjacent to the trees shall be kept shaded with burlap or canvas.

5.3.4.11 Field Quality Control

Hydrostatic Pressure Testing

City of Calgary Hydrostatic Pressure Testing Procedures shall be followed for all piping related to the pump station. The City of Airdrie shall be given at least two full working days’ notice prior to the testing being undertaken. The Developer shall not operate any existing water valves. Should any test disclose leakage greater than the allowable,
the Contractor shall, at his own expense, locate and repair the defect. Any failed test attempt must be rescheduled with at least two full working days’ notice. The main may not be put into service until the test results have been forwarded to and accepted by Engineering Services

5.3.4.12 Clean Up

Clean-up site as each portion of work progresses. Remove refuse and excess dirt from the site. Sweep or wash all walks and paving. Repair any damage sustained to the work of others to original conditions.
6. IRRIGATION INFRASTRUCTURE WITHIN OPEN SPACES

6.1 Irrigation

All specifications per Calgary Parks 2017, Development Guideline and Standard Specifications: Landscape Construction except where noted below.

1. Water Service Connection:

The point of connection (POC) refers to the place where the irrigation system is connected to the water source. The POC will be drainable and include, but not limited to, a backflow preventer, meter, master valve, flow sensor, isolation valve and a blowout connection. Refer to Drawing Sheets No. 01-04 for design and installation purposes (Appendix 7).

a. Backflow preventer- shall be a double check valve assembly (DCVA), equipped with a drain, and sized to meet flow requirements
b. Meters- will be supplied by the City of Airdire (Appendix 7)
c. Vaults- should be big enough to house the backflow preventer and meter with adequate room to service these components. No flanges are to be within 12” of the vaults wall. A spool is required between the two components to meet the installation recommendations from the manufacturer
d. Master Valves- A Hunter IBV valve is recommended and sized to meet the design criteria. If selecting a valve from another product line a pump start relay shall be installed inside the electrical cabinet.
e. Flow sensors- A Hunter Flow Sync with a schedule 80 receptacle tee shall be used. It will be sized to maximize flow rates to minimize water windows. Installation shall be in accordance with manufactures recommendations. Flow charts comparing design and actual flows shall be included with the as-builts. The wire should be rated for direct burial, be a continuous run with no splices, housed into a separate sleeve leading into the electrical cabinet and not bundled with the 24v AC control wire. The wire shall follow the parameters of being a pair of 18AWG stranded conductor wire with aluminum mylar foil shield enclosed in a polyvinyl chloride jacket.
f. Isolation valves / Drains / Blowouts: refer to the Calgary Parks specifications

Note: Where a non-potable water source is being utilized refer to Section 5 Irrigation – Stormwater for Re-Use from the City of Airdrie General Design Standards & Construction Specifications.
2. Irrigation System Requirements:

Hunter’s Irrigation Management & Monitoring Software (IMMS) utilizes the ACC controller to communicate and manage schedules, flow and other pertinent features and accessories. Communication hardware for each site shall include: Hunter ACC-COM-HWR or ACC-HWR-LAN and Hunter’s radio product # RAD3. It is the responsibility of the contractor to ensure there is communication to the central control prior to FAC. If an alternate antenna is necessary it shall follow industry standards and approved by City of Airdrie Parks.

   a. Where a communication hub is required, City of Airdrie Parks will notify the developer/designer.
   b. When a weather station is required, determined by City of Airdrie Parks, a Hunter ET sensor shall be installed in accordance with the manufactures recommendations.

Electrical enclosures shall be configured to match Drawing Sheet No. 10 (Appendix 7).

   a. For outdoor installations, the controller enclosure shall be fixed to a concrete pad and offer a superior level of protection from corrosion and extreme environments. It should not be shaded by other site structures, houses and trees and/or their potential growth, ensuring a strong radio communication signal. The omni antenna shall be mounted flush to the top of the enclosure.
   b. For indoor installations, the controller shall be installed in an approved cabinet, centered 1650mm above the floor, grounded per building code with lightning protection. A conduit shall be run to the exterior of the building to house the antenna wire. Whenever possible, an Ethernet connection will be provided by the City.
   c. Different voltages require separate conduits with all visual wires being labeled.

All electric zone valves can be plastic, glass-filled nylon construction with fabric reinforced rubber diaphragms

3. Irrigation Controller Requirements:

   a. All irrigated sites will require the installation of the Hunter ACC or Hunter ACC99-D Controller.
   b. Sites exceeding 40 zones require Hunter ACC99-D controller and appropriate wiring configuration.
   c. Sites constructed in phases, regardless of system size, require Hunter ACC99-D controller and appropriate wiring configuration.
   d. System designers are required to consult with the City of Airdrie Parks department to fine tune Hunter ACC controller communication hardware requirements.
   e. To facilitate the City of Airdrie’s manufacturer’s warranty coverage on communication components, communication hardware must be installed and tested with central point no earlier than 30 days prior to the FAC inspection. Written notice with the date of installation must be forwarded to the Parks Department.
   f. Wire for Hunter ACC99-D controller configurations shall be Hunter ID1 (14 AWG) or Hunter ID2 (12 AWG) decoder cable, depending on wire-run length.
i. Hunter ID1 up to 10,000 foot wire run
ii. Hunter ID2 between 10,000 and 15,000 foot wire run
g. Separate two-wire paths originating from the controller must have contrasting cable jacket coloring.
h. Spare wires are not required for Hunter ACC99-D controller wiring configurations.
i. ACC99-D controller wiring details
The following decoder modules are to be used, wired according to detail drawings, depending on number of adjacent zone valves:
   i. 1 valve: Hunter IDS-100
   ii. 2 valves: Hunter IDS-200
   iii. 3 valves: Hunter IDS-400*
   iv. 4 valves: Hunter IDS-400
   v. 5 valves: Hunter IDS-600*
   vi. 6 valves: Hunter IDS-600
   viii. *last wire pair on decoder module to be left empty. Note the zone number of empty wire pair during installation, as this must be left blank in the controller. For example, a three valve manifold followed downstream by a two valve manifold will use one IDS-400 and one IDS-200. The empty wire pair will be assigned as Zone 4, resulting in valves being assigned zones 1,2,3,5, and 6.
j. Decoder modules must be grounded using a 48”x4” copper grounding plate every 1000 feet or every 12th decoder module, whichever comes first.
k. During phased construction of parks, the decoder wire ends at the future tie-in point must be protected from short-circuit using 1 DBY wire splice kit on each of the wires. Wire ends should be enclosed in a round valve box with approximately 600mm extra wire.

4. Filter Fabric for Valve Boxes:
   a. Line the excavated area for irrigation boxes with landscape filter fabric prior to installation of gravel. Wrap filter fabric around the sides and pipe access to prevent dirt from entering the box.

5. Thrust Blocking:
   a. Install thrust blocks or anchoring for 63 mm and larger fittings, in strict accordance with the manufacture’s recommendations, for all changes of direction in piping, reducers and isolation valves. Install the thrust block of the appropriate bearing area against solid ground. Concrete thrust block shall not touch the pipe or wires thus allowing access for repair. Wrap all changes of direction in piping (bends), reducers, and isolation valves. Use 6 mil plastic to prevent direct contact with the concrete blocking. In no case will field stone, concrete or cinder blocks or wood of any form, be acceptable for thrusting.
6. Utilities and Billing:
   
   a. Water Service
      i. Contractor will pay for all water until project is accepted and account transferred to the City. Proof of request for transfer of account must be presented at FAC. Contractor remains responsible for water used and payment thereof until transfer.
   
   b. Electrical Service Installation
      i. The contractor must obtain account with power company and pay for all power used until project accepted. At Final Acceptance, Contractor will submit electrical meter account numbers and proof of request for account transfer to the City. Contractor remains responsible for electricity used and payment thereof until transfer.

7. Shared Sites and Shared Controllers:
   
   a. 2 developers – will require separate water services and electrical cabinets, 1 per site.
   
   b. 1 developer (shared water supply) – at the end of the main line in any phases, a quick coupler and isolation valve shall be installed. The developer will not have access to the point of connection. A watering schedule shall be submitted before design approval to ensure it fits within the City water window.
   
   c. 1 developer (shared controller) - When programming changes are required by the developer, they are to email City of Airdrie Parks (parks@airdrie.ca) with all the necessary information. Upon receiving the email the City will evaluate the request and carry out the request within the City water window. The City will coordinate changes within 24hrs with the developer. The developer will not have access into the electrical cabinet.
7. Roadways

7.1 Design

Engineering drawings showing detailed design of the streets shall be submitted to Engineering Services for approval prior to any construction. These drawings shall show details as specified in the Engineering Drawing Standards (section 2.4).

All Local and Collector roadways shall be designed utilizing the “City of Calgary Design Guidelines for Subdivision Servicing” (current edition). Residential roadway design shall be designed utilizing the following criteria;

1. The City of Airdrie requires a Structural Pavement Design to support the road design and specifies a minimum pavement structure for all roads, regardless of traffic volumes or in-place site conditions.

2. Staged paving is required for all roadways.

3. Inverted Crown and Cross-Falled road sections will only be considered at the City's discretion.

4. The City of Airdrie requires the minimum pavement structure should be evaluated to allow for a structural equivalency when roads are serving relatively low traffic volumes or when site conditions do not require it i.e. roads on bedrock.

5. The City of Airdrie requires all proposed road structures require a design in accordance with the geotechnical engineer’s recommendation and to the satisfaction of the Engineering Services.

The table below illustrates current and proposed minimum pavement structure for the City roadways:

<table>
<thead>
<tr>
<th>Road Structure</th>
<th>Old Local Airdrie SN = 67</th>
<th>New Local Airdrie SN = 66</th>
<th>New Collector Airdrie Arterial is to AASHTO standards</th>
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<tr>
<td>Pit run</td>
<td>300</td>
<td>200</td>
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<tr>
<td>GBC</td>
<td>50</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>APC</td>
<td>75</td>
<td>80</td>
<td>160</td>
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</tbody>
</table>

Local roads will be paved in two separate lifts.

Bottom lift will be 50mm (minimum) at CCC and top lift will be 30mm (minimum) at FAC.

6. Lanes shall be designed and constructed with a granular section having due regard for normally imposed loads such as construction traffic (i.e. concrete trucks, dump trucks,
etc.) and garbage pick-up trucks. Minimum granular section for normal lane construction shall consist of 100 mm of 50 mm crushed gravel, on top of compacted sub-grade.

7. Paved lane ends (with a minimum width of 5.0 meters) for a minimum distance of 12 meters from street property line. Construct re-enforced concrete apron where sidewalk is separate at lane.

8. Dead-end lanes are not permitted.

9. Temporary road turnarounds (10.5m radius) where approved shall be graveled, oiled and the perimeter shall be post and cable fence at the time of construction and shall be paved prior to F.A.C (if required).

10. All Weather Access Roads are required prior to the release of Building permits.

All weather access includes the following minimum requirements;
   a. An engineered road base
   b. A stamped and signed letter from a registered Engineer confirming adequate construction of the road base
   c. Sidewalks, curb and gutter
   d. Approved access points and turn-around room for emergency vehicles
   e. An inspection by Engineering Services
   f. Roadway maintenance to the City’s satisfaction

Please refer to the “City of Calgary Standard Specifications For Road Construction” (current edition) for detailed specifications.

### 7.2 Pavement Structure

1. All pavement designs shall be submitted by the Developer to Engineering Services for approval. A qualified Professional Engineer shall prepare pavement designs based on the appropriate CBR and DTN values as per City of Calgary specifications, with a design life of 15 years. All pavement designs shall consist of a minimum of two lifts, a base lift and a final lift (top lift) at the time of FAC. Pavement designs shall include a review of sub-grade drainage and/or water table conditions and shall provide recommendations for the use of continuous sub-drains and separation membranes.

2. The asphalt concrete base course shall be paved once a satisfactory base is prepared. The base course shall be “proof rolled” and inspected by a qualified geotechnical engineer in the presence of a City representative. The surface course shall be paved immediately prior to the FAC date, after all maintenance work is completed.

3. Positive drainage to the storm sewer system by means of catch basin or storm manhole weeper holes shall be provided from all granular bases.

4. Recycled concrete may be used as an alternate to pit run road base as approved by Engineering Services.
7.3 Traffic Calming

Where traffic calming includes ‘pinch points’, bollards must be installed at each curve radius. Decorative bollards may be required/approved by Engineering Services. All traffic calming features are to have vertical face curb. Pinch points shall be a minimum 6.5m face of curb to face of curb. Alternative traffic calming measures are encouraged.

7.4 Sidewalks, Walkways and Pathways

1. Curbs shall be low profile except adjacent to reserve, commercial or industrial areas where standard curb shall be constructed. Both sides of all streets constructed shall be complete with low profile curb and gutter with a separate sidewalk or a monolithic curb, gutter and sidewalk unless otherwise approved by the City. Sidewalk is not a normal requirement in an industrial subdivision and shall only be provided in specific locations as may be requested by the City at the time of approval of construction plans and specifications.

2. Typical sidewalk widths can be found on the standard line assignment drawings (refer to Appendix 1). Adjacent to school sites or commercial areas the width of the sidewalk shall be 2.0m.

3. FAC concrete replacement for separate walk will be tied to existing sidewalk using rebar dowels. 10M rebar will be placed every 300mm, placed horizontally between new and existing sidewalk. Please refer to City of Airdrie Drawing R0007 in (Appendix 5) for more information.

4. FAC concrete replacement for monowalk will be tied to existing sidewalk using rebar dowels. If the existing LOG is not damaged, rebar shall be placed horizontally between new and existing sidewalk and into the existing LOG. Please refer to City of Airdrie Drawing R0008 in (Appendix 5) for more information.

5. Construct granular sub-base materials under curb and gutter and under monolithic sidewalk to 150 mm behind the concrete structure, where lots are front serviced.

6. The minimum granular section shall consist of a sub-base as per item 3 above and 100 mm of 20mm crushed road gravel under the concrete walk, curb and gutter.

7. Wheelchair ramps are required at all intersections, and at designated crosswalks.

8. Crosswalks are to be provided and shown on design plans at high profile intersections as required by the City. All required crosswalks shall be installed prior to applying for FAC.

9. Mid-block crossings are discouraged, however with approval from Engineering Services may be utilized. Upon approval, special treatment and consideration to pedestrians is required. Special treatment may include, but is not limited to paving stones, lighting, signage, landscaping, etc.

10. Pathways shall be constructed as per the City of Airdrie Standard Landscape Guidelines and Specifications.
7.5 Sound and Screen Fence

Sound attenuation shall be in accordance with the City of Airdrie Transportation Noise Policy.

1. Sound fence shall be constructed as per the City of Calgary Standard Specifications (current edition) with the following exceptions:
   a. Sound fence is to be constructed entirely within the City of Airdrie road right of way.

2. Screen fence shall be located on Private property.

7.6 Road Surface Painting

All road paint within the City of Airdrie will be Lafrentz System 400 and covered by the Lafrentz 2 year warranty period. Engineering Services will consider alternate solutions only upon viewing of samples and product information submissions.

7.7 Concrete

1. Concrete for all sidewalk and curb and gutter construction shall be Class “A”. All concrete shall meet or exceed City of Calgary specifications. Higher concrete specifications may be applied at the discretion of Engineering Services on a site by site basis.

2. Concrete testing will be conducted as per the City of Calgary Specifications.

7.8 Asphalt Testing

All asphalt must meet City of Calgary specifications. Core sample testing shall be provided for all paving projects. The Consultant shall provide a minimum of one representative test sample per 1000 square meters of paved area, or a minimum of two test samples per day of paving. **Core samples are required in order to determine full depth of Asphaltic Concrete has been achieved.** All test results shall be clearly summarized in a report, certified by a Professional Geotechnical Engineer and submitted with CCC and FAC applications.

7.9 Road Crossings

Developed roads shall be returned to their original condition when it is necessary to excavate an existing road or lane for the purpose of providing a crossing for water or sewer main, gas main, telephone, cable, or other public utilities. Such excavations must be backfilled and compacted. All concrete, asphalt, landscaping and other disturbances shall be replaced in accordance with City of Airdrie specifications and to the satisfaction of the Engineering Services. Full time geotechnical testing, monitoring, and reporting are required for any such work.

1. For sites that require a Development Permit (not associated with the SSA), owner/contractor must complete an Application Authorizing Work on or Within a City of Airdrie Street or Road R/W. See [www.airdrie.ca](http://www.airdrie.ca) for more information.
8. CLOSING OF ROADS

The Developer must apply in writing to Engineering Services to obtain permission for any closing of developed City streets. This application must be received prior to the proposed interruption, and the Developer is required to notify all residents, businesses, schools, affected by the interruption.

Traffic control for construction (i.e. road work, underground services, lane closures, etc.) and all related activities shall be in accordance with the “Alberta Transportation, Traffic Accommodation in Work Zones” (current edition) or the “City of Calgary “Temporary Traffic Control Manual” (current edition). Any work on or beside a public road; will require submission of a traffic accommodation plan to the Engineering Services prior to construction for review. Engineering Services must accept the TAS and the contractor must provide 72-hour notice before the implementation of any traffic accommodation strategy once it has been approved. Refer to www.airdrie.ca for a complete list of requirements.
9. STREET LIGHTING

Street lighting shall be arranged by the Developer to a standard of lighting in accordance with the “Illuminating Engineering Society of North America (IESNA)” for all street types. Street light cables shall be installed underground and an acceptable type of steel post with fixtures shall be provided. All street lighting and underground electrical power distributions systems are to be paid for by the Developer or constructed by the electrical franchisee pursuant to the “Investment Rate Option”. The City shall approve the street lighting layout and line assignments prior to installation. Street lights shall be placed at locations not interfering with proposed driveways and in general, shall be located in line with the extension of common property lines between two lots. All street light fixtures must be approved by Fortis Alberta Inc.
10. TRAFFIC CONTROL SIGNS AND STREET NAME DEVICE

Naming and Standards ~ Manual of Uniform Traffic Control Standards
Please refer to “City of Airdrie Bylaw P-9/2001” for complete information.

10.1 Installation

Please refer to “City of Airdrie Subdivision Servicing Agreement section 2.15” for complete information.
11. TRAFFIC SIGNALS

Traffic signals installations follow the City of Airdrie specifications.

Developer obligations to install traffic signals as agreed upon in the local improvements section of the Subdivision Servicing Agreement must be coordinated with Engineering Services.
12. SHALLOW UTILITIES

The Developer shall arrange with the gas, power and telecommunications companies to have the respective services located or installed. The services shall be installed underground and the line assignments shall be submitted to and approved by Engineering Services. The Developer shall pay any cost for these services charged by the respective utility companies.

The Developer shall provide right-of-ways in each subdivision or register easements in the name of the City of Airdrie for the purpose of utility services of sufficient size and location to the satisfaction of the City of Airdrie.

Utility Right of Ways (U/RWs) shall be 3.5m from property line unless there is a single utility, in which case, the U/RW will be 2.4m from property line (unless otherwise approved by Engineering Services).
13. **APPENDIX**

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NOTES:
- COMMUNICATION PEDESTAL PLACEMENTS TO BE DETERMINED IN FIELD
- PAVED REAR LANE REQUIRED
- THE MAXIMUM SIZE OF STORM IS 610mm (24") DIAMETER & MAXIMUM DEPTH OF 3.30m.
RESIDENTIAL - PARKING
BOTH SIDES
15.00m R/W, 9.00m ROAD

ENVIRONMENTAL CAPACITY 1,000
VEHICLES PER DAY
NOTES:
- HYDRANT ON 2.45 LINE.
- HYDRANT VALVES ON 7.50 LINE.
- VALVES VALVED ON 1.15 LINE.
- TEE'S ON 1.15 LINE.
- PRE-MEASURED SERVICE CONNECTIONS TO BE INSTALLED 0.35 INSIDE P.L. OR 0.50 INSIDE THE P.L. MAIN CROSSING GAS AND ONE OTHER SHALLOW UTILITY.
- HYDRANT & DRAIN VALVES SHALL MAINTAIN A MINIMUM 2.00 SEPARATION TO THE CENTRE LINE OF STREET LIGHT POLES.
- HYDRANT & DRAIN VALVES SHALL MAINTAIN A MINIMUM 2.00 SEPARATION TO THE EDGE OF STREET OR PAVING, TERMINALS AND OTHER SURFACE STRUCTURES.
- ADDITIONAL SEPARATION MAY BE REQUIRED BETWEEN STORM & SANITARY SEWERS IF EXCESSIVE VERTICAL DIFFERENCES OCCURS.
- MINIMUM 2.5 SEPARATION FROM IRRIGATION VALVE TO P.L.

ENVIRONMENTAL CAPACITY 5,000 VEHICLES PER DAY
FOR FLANKAGE LOTS

NOTES:
- Hydrant on 0.50 line.
- Hydrant valves on 0.50 line.
- Service values on 0.50 line.
- Pre-installed service connections to be installed 3.00 inside fl, on 50 inside the fl. when crossing gat and the other shallow utility.
- G.T. cable to be installed in easements only if water is separated from the phone.
- G.T. cable secured in 1.50 easement where there is no gas easement.
- Street light poles and all other surface structures shall maintain a minimum of 3.00 clearance from hydrants.
- Minimum 3.00 clearance of other utilities.
- Minimum 3.00 distance from sanitary and storm lines.
- Minimum 3.00 separation from irrigation valve to MH.

FOR FRONTAGE LOTS

L.G. TO L.G. DIMENSION 7.00m
R.O.W. DIMENSION 23.50m

ENVIRONMENTAL CAPACITY 1,000 VEHICLES PER DAY
- Hydrant on 3.0m line.
- Hydrant valves on 1.0m line.
- Service valves on 2.5m line.
- Trees on 2.5m line in boulevard and on centre line in median.
- Trees shall be shallow rooted deciduous species as approved by Parks/Recreation Dept.
- Hydrant & service valves shall maintain a min of 3.0m separation to the centre line of street light poles.
- Hydrant & service valves shall maintain a min of 3.0m separation to the scale of transformer, pull box & junction terminals and other underground structures.
- Watermain will be installed on the opposite side of the road from sanitary and storm lines.
- Pre-installed service connections to be installed 3.0m inside P.L. of 5.0m inside the P.L. when crossing gas and line.
- Other shallow utility.
- Min 2.5m separation from irrigation valve to N.H.

- Environmental capacity 10,000 vehicles per day.
NOTES -
- Hydrant on 2.0m line.
- Hydrant valves on 11.0m line.
- Service valves on 2.5m line.
- Trees on 2.5m line in boulevard and on centre line in median.
- Trees shall be shallow rooted deciduous species as approved by Parks/Recreation Dept.
- Hydrant & service valves shall maintain a min. of 2.0m separation to the centre line of street light poles.
- Hydrant & service valves shall maintain a min. 3.0m separation to the edge of transformer, pull box, or section terminals and other surface structures.
- Watermain will be installed on the opposite side of the road from sanitary and storm lines.
- Pre-installed service connections to be installed 3.0m radius P.L. on 3.0m radius the P.L. when crossing gas and other shallow utility.
- Environmental capacity 10,000 vehicles per day.
NOTES:
- HYDRANT ON 2.00 LINE.
- HYDRANT VALVES ON 3.00 LINE.
- SERVICE VALVES ON 2.00 LINE.
- TREES ON 2.50 LINE IN BROWARD, AND ON CENTRE LINE IN MEDIAN.
- TREES SHALL BE SHALLOW ROOTED DECIDUOUS SPACES
  AS APPROVED BY PARKS/RECREATION DEPT.
- HYDRANT & SERVICE VALVES SHALL MAINTAIN
  A MIN. 3.00 SEPARATION TO THE EDGE OF THE
  TARMAC TERMINALS AND OTHER SURFACE STRUCTURES.
- WATERMAIN WILL BE INSTALLED ON THE
  OPPOSITE SIDE OF THE ROAD FROM SANITARY
  AND STORM LINES.

- NO RESIDENTIAL FRONTAGE
- NO TRUCK ROUTES
- ENVIRONMENTAL CAPACITY 15,000
  VEHICLES PER DAY
NOTES:
- WATER AND SANITARY MAINS MAY BE CONSIDERED WITHIN MAJOR ROAD, ONLY UPON APPROVAL FROM THE CITY OF AIRDRIE.
- STORM MAIN ALIGNMENT TO BE DETERMINED AS PART OF CONSTRUCTION STAGING.
- WHERE APPLICABLE - HYDRANT ON 4.90 LINE.
  - HYDRANT VALVES ON 1.00 LINE FROM WATERMAIN
  - SERVICE VALVES ON 4.00 LINE.
  - WATERMAIN WILL BE INSTALLED ON THE OPPOSITE SIDE OF THE ROAD FROM STORM AND SANITARY LINES.
  - PRE-INSTALLED SERVICE CONNECTIONS TO BE INSTALLED 3.30m INSIDE P.L. OR 5.50m INSIDE P.L. WHEN CROSSING GAS AND ONE OTHER SHALLOW UTILITY.
- TREES ON 4.00 LINE IN BOULEVARD AND 18.00 LINE IN MEDIAN.
- TREES SHALL BE OF A SPECIES AS APPROVED BY PARKS / RECREATION.
- ALL TREES TO BE SHALLOW ROOT SPECIES.
- STREETLIGHT ALIGNMENT PREFERRED IN MEDIAN, ALTERNATE ALIGNMENT IN THE BOULEVARD.
- STREETLIGHT POLES AND ALL OTHER SURFACE STRUCTURES SHALL MAINTAIN A MINIMUM OF 3.00m CLEARANCE FROM HYDRANTS.

ENVIRONMENTAL CAPACITY
10,000 to 30,000 V.P.D.

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NOTES – HYDRANT ON 2.5m LANE
- WORKER VALUES 3.0m FROM WALK
- SERVICE VALVE AT 2.0m OR 1.0m
FROM WALK AT WALKWAY DIVIDING
- STREETLIGHT POLES, TRANSFORMER BOXES
AND ALL OTHER STRUCTURES SHALL
MAINTAIN A MINIMUM OF 3.0m CLEARANCE
FROM WORKER AND SERVICES.
- MINIMUM 2.5m SEPARATION FROM IRRIGATION VALVE TO W.H.
NOTES:
- HYDRANT ON 2.45m LINE.
- HYDRANT VALUES ON 7.00 LINE.
- SERVICE VALUES ON 3.50 LINE.
- PRE-INSTALLED SERVICE CONNECTIONS TO BE INSTALLED 3.00 INCH P.I. OR 3.00 INSIDE THE P.I. WITH VENTING GUY AND ONE OTHER SHALLOW UTILITY.
- HYDRANT & SERVICE VALUES SHALL MAINTAIN A MIN. OF 3.50 SEPARATION TO THE CENTRE LINE OF STREET LIGHT POLES.
- HYDRANT & SERVICE VALUES SHALL MAINTAIN A MIN. 3.00 SEPARATION TO THE EDGE OF TRANSFORMER, PULL BOX & ANCHOR RODS.
- ADDITIONAL SEPARATION MAY BE REQUIRED BETWEEN STEPS & HARDWARE DEPENDING ON THE VERTICAL DIFFERENCE OCCURS.

- ENVIRONMENTAL CAPACITY 7,000 VEHICLES PER DAY.
- REAR LANE RECOMMENDED.
- FRONT DRIVEWAYS ARE ACCEPTABLE.

ALTERNATE WITH MONOLITHIC SIDEWALK.
- SERVICE VALUES ON 1.25m LINE.
ENVIRONMENTAL CAPACITY 5,000 VEHICLES PER DAY
NOTES - HYDRANT ON 2.45m LINE
- HYDRANT VALVES ON 4.50m LINE
- SERVICE VALVES ON 3.00m LINE
- PRE-INSTALLED SERVICE CONNECTIONS TO BE INSTALLED 3.00 INSIDE F.L. OR 5.40 INSIDE THE F.L. WHEN CROSSING SAG AND ONE VALVE IN SAG
- HYDRANT & SEPARATE VALVES SHALL MAINTAIN A MIN. 2.50m SEPARATION TO THE CENTRE LINE OF STREET LIGHT POLES
- HYDRANT & SERVICE VALVES SHALL MAINTAIN A MIN. 3.00 SEGREGATION TO THE EDGE OF TRANSFORMER, F/L BOX / L-BOX TERMINALS AND OTHER SURFACE STRUCTURES,
- ADDITIONAL SEGREGATION MAY BE REQUIRED BETWEEN STORM & SANITARY SEWERS IF EXCESSIVE VERTICAL GROUND FALLS
- MINIMUM 2.5m SEPARATION FROM IRRIGATION VALVE TO M.H.

- ENVIRONMENTAL CAPACITY 3,000 VEHICLES PER DAY

ALTERNATE WITH MONOLITHIC SIDEWALK
- SERVICE VALVES ON 1.5m LINE
R-1SL ZONING ONLY

- HYDRANT ON 3.0m LINE.
- HYDRANT VALVES ON 3.0m LINE.
- SERVICE VALVES ON 3.0m LINE.
- PRE-INSTALLED SERVICE CONNECTIONS TO BE INSTALLED 500mm ABOVE PL.
- HYDRANT & SERVICE VALVES SHALL MAINTAIN A MIN. OF 3.0m SEPARATION TO THE CENTRE LINE OF STREET LIGHT POLES.
- HYDRANT & SERVICE VALVES SHALL MAINTAIN A MIN. 3.0m SEPARATION TO THE EDGE OF ALL OTHER SURFACE STRUCTURES.
- ADDITIONAL SEPARATION MAY BE REQUIRED BETWEEN STORM & SANITARY SEWERS & EXCESSIVE VERTICAL DIFFERENCE SITES.
- ELECT./COMM./GAS SERVICES IN REAR LANE
- MINIMUM 2.5m SEPARATION FROM IRRIGATION VALVES TO M.H.

- ENVIRONMENTAL CAPACITY 1,000 VEHICLES PER DAY
- PAVED REAR LANE REQUIRED
- ZONING FOR R1 SL REQUIRES DECORATIVE LIGHTING TO CITY OF AIRDRIE SATISFACTION
- ELEC./COMM./GAS SERVICES FOR R1-SL IN REAR LANE (SEE SHEET 2 FOR DETAILS).
NOTES:
- WATER AND SANITARY MAINS MAY BE CONSIDERED WITHIN MAJOR ROAD ONLY UPON APPROVAL FROM THE CITY OF AIRDRIE.
- STORM MAIN ALIGNMENT TO BE DETERMINED AS PART OF CONSTRUCTION STAGING.
- WHERE APPLICABLE:
  - HYDRANT ON 6.20 LINE.
  - HYDRANT VALVES ON 1.00 LINE FROM WATERMAIN.
  - SERVICE VALVES ON 4.00 LINE.
  - WATERMAIN WILL BE INSTALLED ON THE OPPOSITE SIDE OF THE ROAD FROM STORM AND SANITARY LINES.
  - PRE-INSTALLED SERVICE CONNECTIONS TO BE INSTALLED 3.50m (O.D.) P.L. OR 5.00m (O.D.) P.L. WHEN CROSSING GAS AND ONE OTHER SHALLOW UTILITY.
- TREES ON 5.70 LINE IN BOULEVARD AND 20.00 LINE IN MEDIAN.
- TREES SHALL BE OF A SPECIES AS APPROVED BY PARKS / RECREATION.
- ALL TREES TO BE SHALLOW ROOT SPECIES.
- STREETLIGHT ALIGNMENT PREFERRED IN MEDIAN ALTERNATE ALIGNMENT IN THE BOULEVARD.
- STREETLIGHT POLES AND ALL OTHER SURFACE STRUCTURES SHALL MAINTAIN A MINIMUM OF 3.50m CLEARANCE FROM HYDRANTS.

ENVIRONMENTAL CAPACITY
10,000 to 30,000 V.P.D.

THIS STANDARD IS INTENDED AS A GUIDELINE FOR NEW DEVELOPMENT, WHERE NOT APPLICABLE, MAKE ADJUSTMENTS AS REQUIRED.
NOTES:  
- WATER AND SANITARY MAINS MAY BE CONSIDERED IN MAJOR ROADS ONLY UPON APPROVAL FROM THE CITY OF AIRDRIE.
- STORM MAIN ALIGNMENT TO BE DETERMINED AS PART OF CONSTRUCTION STAGES.
WHERE APPLICABLE:  
- HYDRANT ON 6.00 LINE.
  - HYDRANT VALVES ON 1.00 LINE FROM WATERMANN
  - SERVICE VALVES ON 4.00 LINE.
  - WATERMANN WILL BE INSTALLED ON THE OPPOSITE SIDE OF THE ROAD FROM STORM AND SANITARY LINES.
  - PRE-INSTALLED SERVICE CONNECTIONS TO BE INSTALLED 3.00M INSIDE P.L. OR 5.00M INSIDE P.L. WHEN CROSSING GAS AND ONE OTHER SHALLOW UTILITY.

ENVIRONMENTAL CAPACITY
20,000 to 45,000 V.P.D.

TREES ON 6.00 LINE IN BOULEVARD AND 2.50 LINE IN MEDIAN.
- TREES SHALL BE OF A SPECIES AS APPROVED BY PARKS / RECREATION.
- ALL TREES TO BE SHALLOW ROOT SPECIES.
- STREET LIGHT ALIGNMENT PREFERRED IN MEDIAN, ALTERNATE ALIGNMENT IN THE BOULEVARD.
- STREET LIGHT POLES AND ALL OTHER SURFACE STRUCTURES SHALL MAINTAIN A MINIMUM OF 3.00M CLEARANCE FROM HYDRANTS.

THE STANDARD IS INTENDED AS A GUIDELINE FOR NEW DEVELOPMENT, WHERE NOT APPLICABLE, MAKE ADJUSTMENTS AS REQUIRED.
LINE ASSIGNMENT FOR RW ZONING ONLY

NOTES:
- HYDRANT ON 0.50 LINE
- HYDRANT VALVES ON 5.0 LINE
- SERVICE VALVES 5.0m IN PROPERTY
  (WITHIN REGISTERED UR/W)
- PRE-INSTALLED SERVICE CONNECTIONS TO BE
  INSTALLED 2.0m INSIDE P/L
- HYDRANT & SERVICE VALVES SHALL MAINTAIN
  A MIN. OF 3.0m SEPARATION TO THE CENTRE
  LINE OF STREET LIGHT POLES.
- HYDRANT & SERVICE VALVES SHALL MAINTAIN
  A MIN. 3.0m SEPARATION TO THE EDGE OF
  ALL OTHER SURFACE STRUCTURES.
- ADDITIONAL SEPARATION MAY BE REQUIRED:
  BETWEEN STORM & SANITARY SEWERS IF
  EXCESSIVE VERTICAL DIFFERENCE OCCURS.
- MINIMUM 2.0m SEPARATION FROM IRRIGATION VALVE TO M.K.

- ENVIRONMENTAL CAPACITY 1,000
  VEHICLES PER DAY
- ZONING FOR RW REQUIRES DECORATIVE
  LIGHTING TO CITY OF AIRDRIE SATISFACTION
- ELECT./COMM./GAS SERVICES FOR RW ZONING
  WITHIN ROAD R/W AS SHOWN
- 1.5m UR/W REQUIRED FOR CURB STOPS
  AND TRANSFORMERS
- TREES PERMITTED WITHIN UR/W.
  (MUST BE MIN. 2.0m FROM TRANSFORMERS,
  PEDESTALS, JUNCTION BOXES, ETC.)
LINE ASSIGNMENT FOR RW ZONING ONLY

NOTES:
- HYDRANT ON 2.85 LINE
- HYDRANT VALUES ON 7.50 LINE
- SERVICE VALUES ON 2.50 LINE
- TREES ON 3.00 LINE
- PRE-INSTALLED SERVICE CONNECTIONS TO BE INSTALLED 3.50 INSIDE PROPERTY LINE
- HYDRANT & SERVICE VALUES SHALL MAINTAIN A MIN. OF 3.00 SEPARATION TO THE CENTRE LINE OF STREET LIGHT POLES
- HYDRANT & SERVICE VALUES SHALL MAINTAIN A MIN. 3.00 SEPARATION TO THE EDGE OF TRANSFORMER, FULL BOX / JUNCTION TERMINALS AND OTHER SURFACE STRUCTURES.
- ADDITIONAL SEPARATION MAY BE REQUIRED BETWEEN STORM & SANITARY SEWERS IF EXCESSIVE VERICAL DIFFERENCE OCCURS.
- WHERE NO UR/W EXISTS, STREET LIGHT CABLE ALIGNMENT IS 3.75m FROM PL IN CONSULT.
- MINIMUM 2.0m SEPARATION FROM IRRIGATION VALVE TO M.R.

- ENVIRONMENTAL CAPACITY 5,000 VEHICLES PER DAY
- ZONING FOR RW REQUIRES DECORATIVE LIGHTING TO CITY OF ARURIE SATISFACTION

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<th>Adopted by</th>
<th>Approved by</th>
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<td>City Engineer</td>
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<td>N.T.S.</td>
<td>City of Arurie for the Sizing Only</td>
<td>City Engineer</td>
</tr>
</tbody>
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21.00m R/W, 11.50m ROAD

Airrie

Collector - RW Zoning
Parking Both Sides
## Appendix 2

**CONSTRUCTION COMPLETION CERTIFICATE SUBMISSION CHECK LIST**

**SUBDIVISION:**

- Digital copy of all as-built covenants (Including Surface, Storm, Sanitary, Water covenants & BGP)

**PHASE:**

- Updated: July 2017

### Sanitary Sewers
- Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Inspectors installation reports
  - Detailed video inspection reports
- Watermain & Hydrants
  - Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Inspectors installation reports
  - Letter to Fire Chief
  - Hydrostatic test results
  - Health Unit test results

### Storm Sewers
- Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Inspectors installation reports
  - Detailed video inspection report

### Sewer & Water Connections
- Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Inspectors installation reports
  - As-Built AutoCad points file showing location and elevation of the service valves.

### Overland Drainage
- Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Inspectors installation reports
  - Concrete test results

### Sidewalks, Curb, Gutter & Catch Basins
- Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Inspectors installation reports
  - Concrete test results

### Paved Roads
- Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Asphalt test results (Cores test & Marshall analysis)
  - Inspectors installation reports

### Paved or Gravelled Lanes
- Three copies of the CCC applications with reduced plans
  - Compaction reports
  - Asphalt test results (Cores test & Marshall analysis)

### Sound Attenuation Fence
- Three copies of the CCC applications with reduced plans
  - Inspectors installation reports

### Stormwater Irrigation Supply Line
- Three copies of the CCC applications with reduced plans
  - Pressure test results
  - Compaction test results

### Stormwater Retention Facilities
- Three copies of the CCC applications with reduced plans
  - Cross-sections of retention pond (representative of pond depth)

### Stormwater Irrigation Pump Station
- Three copies of the CCC applications with reduced plans
  - Operation & maintenance manual
  - Operating training for City staff
  - Record Drawings

**Date:**

**Comments:**

---

95
**Appendix 3**

**FINAL ACCEPTANCE CERTIFICATE SUBMISSION CHECK LIST**

<table>
<thead>
<tr>
<th>SUBDIVISION:</th>
<th>PHASE:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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- ☐ Digital copy of all final as-built profilesheets*  
  (Including Surface, Storm, Sanitary, Water coversheets & BGP)  
  Updated: July 2017

<table>
<thead>
<tr>
<th>Sanitary Sewers</th>
<th>Storm Sewers</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ three copies of the FAC applications with reduced plans</td>
<td>☐ three copies of the FAC applications with reduced plans</td>
</tr>
<tr>
<td>☐ detailed video inspection report</td>
<td>☐ detailed video inspection report</td>
</tr>
<tr>
<td>☐ manhole report (if required)</td>
<td>☐ manhole report (if required)</td>
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</table>

<table>
<thead>
<tr>
<th>Watermains &amp; Hydrants</th>
<th>Sewer &amp; Water Connections</th>
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</thead>
<tbody>
<tr>
<td>☐ three copies of the FAC applications with reduced plans</td>
<td>☐ three copies of the FAC applications with reduced plans</td>
</tr>
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<table>
<thead>
<tr>
<th>Overland Drainage</th>
<th>Sidewalks, Curb, Cutter &amp; CatchBasins</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ three copies of the FAC applications with reduced plans</td>
<td>☐ three copies of the FAC applications with reduced plans</td>
</tr>
<tr>
<td>☐ compaction reports (if required)</td>
<td>☐ compaction reports (if required)</td>
</tr>
<tr>
<td>☐ concrete test results (if required)</td>
<td>☐ concrete test results (if required)</td>
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</table>

<table>
<thead>
<tr>
<th>Paved Roads</th>
<th>Paved or Gravelled Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ three copies of the FAC applications with reduced plans</td>
<td>☐ three copies of the FAC applications with reduced plans</td>
</tr>
<tr>
<td>☐ asphalt test results (including core thicknesses)</td>
<td>☐ compaction reports (if required)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sound Attenuation Fence</th>
<th>Stormwater Retention Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ three copies of the FAC applications with reduced plans</td>
<td>☐ three copies of the FAC applications with reduced plans</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stormwater Irrigation Supply Line</th>
<th>Stormwater Irrigation PumpStation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ three copies of the FAC applications with reduced plans</td>
<td>☐ three copies of the FAC applications with reduced plans</td>
</tr>
<tr>
<td>☐ second pressure test results (if required)</td>
<td>☐ FAC's for Landscaping sent to Parks</td>
</tr>
<tr>
<td>☐ FAC's for Screen Fencing sent to Parks</td>
<td>Date: ____________________</td>
</tr>
</tbody>
</table>

Comments:

________________________________________
________________________________________
________________________________________

*Engineering Services requests 1 set of drawings for review prior to final digital as-built profile submissions.
Appendix 4

SCHEDULE "D" - LOCAL IMPROVEMENT MAINTENANCE PERIODS SUBJECT TO SCHEDULE "G"

1.1 LOCAL IMPROVEMENTS MAINTENANCE PERIOD

1.2 Sanitary Sewers

The maintenance period for Sanitary Sewers shall be a period of One (1) Year from signing of the CCC.

1.3 Storm Sewers

The maintenance period for Storm Sewers shall be a period of One (1) Year from signing of the CCC.

1.4 Water Mains & Hydrants

The maintenance period for Water Mains and Hydrants shall be a period of One (1) Year from signing of the CCC.

1.5 Sewer & Water Connections

Typically, the maintenance period for Sewer and Water Connections shall be a period of One (1) Year from signing of the CCC, however, the Developer's obligations for maintenance in respect to water and sewer connections shall not terminate until thirty (30) days after the granting by the Municipality, of occupancy permits, pursuant to the Alberta Safety Codes Act Regulations, for buildings on seventy-five percent (75%) of the lots created by the subdivision.

1.6 Sidewalks, Curbs, Gutters and Catch Basins

The maintenance period for Sidewalks, Curbs, Gutters and Catch Basins shall be two (2) winter seasons from signing of the CCC, provided that requested documentation and reports are
provided within two (2) months of the date of inspection. Additionally, the developer shall be responsible for any and all repairs and replacements necessitated by builder damage to sidewalks, curbs and gutters (after the acknowledgement of the FAC as outlined in Article 5.00).

To secure the performance of its obligation to repair building damage to sidewalks, curbs and gutters (when located adjacent to undeveloped lots (occupancy has not been issued) requiring building, driveway or landscape construction) that occurs after the acknowledgement of the FAC for the same, the Developer may choose either:

a) To continue to maintain and repair the said sidewalks, curbs and gutters following the acknowledgment of the FAC and provide security to the City (that the City will be entitled to use in the event of a default of the obligation to maintain and repair) in the amount of $500 per undeveloped lot prior to the acknowledgement of the FAC. These securities will not be released until development of the adjacent lot is completed and all repairs to the said sidewalks, curbs and gutters have been completed to the satisfaction of the City; or

b) To cease to maintain and repair the said sidewalks, curbs and gutters following the acknowledgement of the FAC. The City will assume the maintenance of the said sidewalks, curbs and gutters, and the developer shall pay to the City $1000 per undeveloped lot. The City will be entitled to keep this payment regardless of whether any or all of it is expended by the City for said maintenance and repair.

1.7 Paved Roads, Lanes and Walkways (excepting Top Lift)

The maintenance period for Paved Roads, Lanes and Walkways is to be a period of Two (2) Years (two (2) winter seasons) from signing of the CCC.

Major road standard at any time: two (2) years limited to installation work and performance of materials. The developer shall be responsible for correction of defects arising from accidental damage or damage caused by settlement, subsidence or failure of the carriageway on which the surfacing material has been laid.
Roads other than major road standard after September 15: One (1) year limited to installation work and performance of materials, excluding third party damage or settlements.

1.8 Graveled Lanes

The maintenance period for Graveled Lanes shall be a period of One (1) year from signing of the CCC. Including but not limited to manhole frames and covers, watermain and hydrant valves and valve operating mechanisms, cathodic test points, water service connection valves and valve operating mechanisms, and catch basin leads installed in these lanes.

If the developer fails to obtain the FAC prior to the onset of the Second Winter Season following the installation of the infrastructure located underground, the Developer shall reshape lanes to the design grades and slopes, gravel where necessary, repair and adjust manholes, hydrants and all valves, cathodic protection test points, catch basin leads provided that:

i) A minimum of seventy-five percent (75%) of the lots in the development area that are lane serviced all have underground services installed by the developer, natural gas provider, electrical, telephone and cable service providers, and

ii) No single lane has less than fifty percent (50%) of all the house services installed.

1.9 Overland Drainage Facilities

The maintenance period for Overland Drainage Facilities shall be a period of One (1) Year from signing of the CCC.

1.10 Landscaping

The maintenance period for Landscaping shall be a period of one (1) growing season, to include one winter season, from signing of the CCC, unless otherwise specified in the City of Airdrie Standard Landscape Guidelines and Specifications. As-built information is to be submitted showing the approved surface contours are met.
1.11 Pumping Stations and Pressure Control Facilities

The maintenance period for Pumping Stations and Pressure Control Facilities shall be a period of One (1) Year from signing of the CCC.

1.12 Water Retention Facilities (Wet and Dry Ponds)

The maintenance period for Water Retention Facilities shall be a period of Four (4) Years from signing of the CCC. If a storm water retention facility abuts a Municipal Reserve parcel, the Municipal Reserve portion of the site lying outside of the High Water Level of the storm retention facility shall be subject to a maintenance period of one (1) growing season, to include one winter season, from the signing of the CCC, following a satisfactory catch of all plant material. If during the four-year Maintenance schedule applicable to the storm water retention facility any deficiency that includes the MR area (even after MR FAC) this portion shall be subject to the same four-year Maintenance schedule as applies to the storm water retention facility. This additional Maintenance schedule may be reduced at the option of the City upon being satisfied with the repairs to the Municipal Reserve site.
1.13 Stormwater Irrigation Supply Line

The maintenance period for the Stormwater Irrigation Supply Line shall consist of One (1) summer of operation, One (1) winterization and shutdown and One (1) spring startup operation from the signing of the CCC.

1.14 Stormwater Irrigation Pump Station

The maintenance period for the Stormwater Irrigation Pump Station shall be a period of Two (2) years from signing of the CCC.
Appendix 5

W0001 – Standard Water Valve .................................................................................................................. 103
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NOTES:
1. All material cast iron except where noted.
2. Tolerance allowed on top box & lid measurements.
3. Box diameter 125mm.
4. Bottom box dimensions for valve of larger than 200mm ID shall conform to 1.5.6.1.6.1.2.1.
5. The exterior of the top box, steel casing and the exterior and interior of the bottom box shall be factory coated in accordance with section 360.0.00.
6. The operating rod shall have an external part joining methods by welding or shop methods are not acceptable.
7. The casing shall conform to section 360.0.02.

Dimensions are in mm unless otherwise noted.
SINGLE VENT HOLE COVER
FOR SANITARY SEWER MANHOLE COVERS LOCATED IN TRAPPED LOWS, EITHER A SINGLE VENT HOLE COVER IS REQUIRED OR 1 OF THE 2 VENT HOLES ARE TO BE PLUGGED.

MANHOLE SEALS ARE ALSO REQUIRED ON WEEPING TILE MANHOLES LOCATED IN TRAP LOWS FOR DESIGNS THAT EMPLOY THE THREE PIPE SYSTEM.

PLUGS & SEALS SUBJECT TO APPROVAL BY THE ENGINEER.

MATERIAL SPECIFICATIONS:
- GREY CAST IRON TO CONFORM TO CLASS 2D A.S.T.M A48 (LATEST EDITION)
- BEARING SURFACE SHALL BE GROUND OR MACHINED TO PREVENT ROCKING
- NOMINAL MASS = 72 KILOGRAMS PER
- SHALL BE COATED WITH ASPHALT VARNISH

Dimensions are in mm unless otherwise noted.
NOTES:
1. CHANNEL WIDTH REQUIREMENT AS PER BENCHING DETAIL – SHEET No. 29 (452.1003.007)
2. THIS MANHOLE TO BE CONSTRUCTED ON 100, 150, 200, 250, 300mm CONNECTIONS.
3. PROVIDE A MINIMUM OF 150mm TO A MAXIMUM OF 310mm DROP FROM THE INCOMING PIPE TO THE INVERT OF THE PRE-BENCH CHANNEL
4. SANITARY TEST MANHOLE TO BE LOCATED ON PRIVATE PROPERTY
5. SANITARY TEST MANHOLE MUST REMAIN ACCESSIBLE AND NOT BEHIND PROPERTY ACCESS GATES

PLAN

SECTION 'A-A'

- a) 150mm MIN/810mm MAX ON NEW INSTALLATIONS
  - b) 50 mm ON EXISTING SERVICE LEADS

SECTION 'B-B'

MATERIAL SPECIFICATIONS:
(ALL SPECIFICATIONS & STANDARDS REFER TO LATEST EDITION)
1. CEMENT: SULFATE RESISTANT TYPE: TYPE HS (TYPE 50) TO CSA A3001
   OR TYPE V TO ASTM C150
2. CONCRETE COMPRRESSIVE STRENGTH: 27.6 MPa AT 28 DAYS
3. AIR CONTENT: 4 TO 7% EXCEPT WHERE NO-SLUMP CONCRETE IS USED
SPECIFICATIONS:
1. INTERIOR DROP BY RELINER OR APPROVED ALTERNATE
2. MINIMUM 2 BRACKETS PER VERTICAL PORTION OF SYSTEM
3. BRACKETS SPACING MAXIMUM 1200MM
4. PIPE SUPPORTS HAVE ADJUSTABLE BRACKETS AND MADE OF 1/02 WIDTH 11 GAUGE TYPE 304 STAINLESS STEEL
5. PINCH BOLTS AND NUTS SHALL BE 3/8" DIAMETER, 18-8 STAINLESS STEEL
6. PIPE SUPPORTS SHALL BE RELINER OR APPROVED ALTERNATE

NOTES:
1. USE INTERIOR DROP WHEN INCLINING INVERT IS 75mm ABOVE OUTGOING PIPE CENTERLINE
2. CONCRETE BENCHING SHALL BE 30MPa IN 28 DAYS
3. ONLY ONE INTERIOR DROP MAY BE USED PER MANHOLE
4. FLOW CHANNEL TO BE 1/2 PVC PIPE OR CONCRETE AS SPECIFIED

SECTION A-A

INVERT EXTENDS 35mm PAST FACE OF MANHOLE
RELINER INTERIOR DROP BOWL
BRACKETS AS PER SPEC #4 & #5
PIPE SUPPORT SPACING AS PER SPEC #42
PVC VERTICAL PIPE PROVIDED BY CONTRACTOR
22-1/2" PVC ELBOW
MAX. 220mm
STORM MANHOLE COVER

TOP VIEW

SECTION 'A--A'

BOTTOM VIEW

MATERIAL SPECIFICATIONS:

- GREY CAST IRON TO CONFORM TO CLASS 20
- ASTM A48 (LATEST EDITION)
- BEARING SURFACE SHALL BE GROUND OR MACHINED TO PREVENT ROCKING
- NOMINAL MASS = 72 KILOGRAMS 0%
- SHALL BE COATED WITH ASPHALT VARNISH

Dimensions are in cm unless otherwise noted.
R0002

RURAL RESIDENTIAL CROSSING SWML

SECTION AA

500mm CULVERT
TAPPED ON, SPOKE ENDS
1.5M BEYOND 2:1 SIDE SLOPE

DRAINAGE SLOPE THROUGH SWML

SECTION BB

25mm DRAIN
50mm DRAIN
75mm DRAIN

500mm CULVERT
HAND PLACED RPRP

RPRP EXTENDS 1.0M
BEYOND FRONT EDGE
OF CULVERT

Dimensions shown unless otherwise noted.
NOTES:
1. WHEN ONE OR MORE PANELS OF CONCRETE SIDEWALK
   ARE REPLACED (CSCD FAC, DAMAGED, TRIP HAZARD, ETC.)
   THE NEW SIDEWALK WILL "TIE INTO" THE EXISTING SIDEWALK
   UTILIZING 15M EPOXY COATED REBAR (PLACED HORIZONTALLY)
   AT 300MM OC
NOTES:
1. WHEN ONE OR MORE PANELS OF CONCRETE SIDEWALK ARE REPLACED (CCC/PAE, DAMAGED, TRIP HAZARD, ETC.) THE NEW SIDEWALK WILL TIE INTO THE EXISTING SIDEWALK UTILIZING 10M EPOXY COATED REBAR (PLACED HORIZONTALLY) AT 300mm OCD.
2. THIS IS TO BE USED WHEN REPLACING THE SLAB ONLY AND EXISTING LOG IS TO REMAIN.
## Appendix 6

City of Airdrie
Design Guidelines for Irrigation Pump Stations

### SCHEDULE C

Potable Water Testing Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limit</th>
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<tbody>
<tr>
<td>Hardness</td>
<td>0.39 mg/L</td>
</tr>
<tr>
<td>Iron</td>
<td>0.3 mg/L</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.05 mg/L</td>
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### SCHEDULE D

Non-Potable Water Testing Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limit</th>
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</thead>
<tbody>
<tr>
<td>Hardness</td>
<td>0.39 mg/l</td>
</tr>
<tr>
<td>Iron</td>
<td>0.3 mg/l</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.05 mg/l</td>
</tr>
<tr>
<td>Total Suspended Solids (TSS)</td>
<td>10 mg/l</td>
</tr>
<tr>
<td>Turbidity</td>
<td>5 NTU</td>
</tr>
<tr>
<td>Total Microcysten</td>
<td>≤ 20 μm/l</td>
</tr>
<tr>
<td>Cyanobacteria</td>
<td>≤ 100,000 cells/ml</td>
</tr>
<tr>
<td>Fecal Coliform/E. Coli</td>
<td>&lt; 200 CFU/100 ml</td>
</tr>
</tbody>
</table>
Appendix 7

01 – 50mm Water Service Plan ............................................................... 119
02 – 50mm Water Service Elevation .......................................................... 120
03 – 100mm Water Service Plan ............................................................... 121
04 – 100mm Water Service Elevation ....................................................... 122
10 – Controller Cabinet ........................................................................... 123
WEATHERPROOF METAL CONTROL CABINET
AS MANUFACTURED BY ACE MFG. COMPANY
100 HMA 3-W EUROBOX 13050G DEMA RY
DOUBLE DOOR OR APPROVED EQUIVALENT.

HUNTER SHROUD SENSOR PRODUCT VARIOUS
TO BE SUPPLIED AND FIELDFITTED BY CERTIFIED
ARIANWIRE INSTALLATION TECHNICALS

LOCKABLE DOORS, HANDLE WITH
INTERNA, ROLLER MECHANICAL

ELECTRICAL METER

ELECTRICAL SURGE PROTECTOR PRODUCT #
SHINDANER SHD-125-01 SINGLE CIRCUIT 120V
RECEIPTION, HAND W/ WIRE

BREAKER BOX PRODUCT #
SHINDANER SBB1250 (SQUARE "1")

VAPORVATION WIRE 322 CONDUIT

GROUND WIRE 322 CONDUIT

120 VAC ELECTRICAL 322 CONDUIT
45mm BACK TO BACK GROUND SUPPORT

100MM DEEP MIN 100MM FROM PAD
SEAL & 30mm FROM SURFACE

100MM DEEP MIN 100MM FROM PAD
100MM DEEP MIN 100MM FROM PAD
SEAL & 30mm FROM SURFACE

14.04% REINFORCED MESH MIN 100MM
FROM PAD & 50MM ABOVE PAD BASE

GROUND PLATE GROUND ROD
6 AWG SOLID COPPER WIRE

GROUND PLATE (102 X 2436 X 1.6)
96 AWG SOLID COPPER WIRE

ELECTRODES SPHERE OF INFLUENCE
BORDAINS

COPPER GROUND PLATE

90MM X 400MM X 300MM 3 MPa,
CONCRETE BASE w/ GRADES (136-14)

PROVIDE ADEQUATE CONCRETE SUGGESTED CONCRETE OPERATING/MAINTENANCE

CONTROLLER

GROUND ROD (10 X 2404)
16 AWG COPPER WIRE

DO NOT INSTALL ANY OTHER WIRES OR
CABLE WITHIN THE SPHERE OF INFLUENCE

* OR BELOW FROSTLINE, WHICHEVER IS DEEPER

NOTE:
- CONTROLLER CABINET SHALL HAVE ELECTRICAL SURGE PROTECTION
- CONTROLLER CABINET SHALL BE GROUNDED AND TESTED TO 5MM OR LESS
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED
- ALL BOXES TO BE GROUNDED AS SHOWN ON DRAWING
- ANY BOX PROVIDE TO CLEAR DRAWING
- ALL BOXES TO BE INSTALLED IN CONCRETE PAD
- MANUFACTURER P FINS TO CONSTRUCTION OF CONCRETE PAD
- CONCRETE SHALL BE BUSHED SO AS WALLS DO NOT EXCEED 40% OF MP/MP
- METER
- EMBRACE ANCHOR BOLT PLACEMENT根据 CIRCUIT SUPPLIED BY PRECEDENT MANUFACTURER

CITY OF AIRDRIE
COMMUNITY & OPPORTUNITY

SHEET TITLE
CONTROLLER CABINET

PROJECT TITLE
SPECIFICATIONS

DATE: FEB 13, 2017

SCALE: 1:20

SHEET NO.
10

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