

Part 1 General

1.1 REFERENCES

- .1 City of Winnipeg Standard Construction Specifications.

1.2 DESCRIPTION OF THE WORK

- .1 Work of this specification covers the standard construction specifications for underground site services at the Site designated for the East Elmwood Community Centre - 490 Keenleyside Street in Winnipeg, Manitoba.
- .2 The work will include:
 - .1 Excavation
 - .2 Installation of approved backfill material
 - .3 Installation of Sanitary Sewer Services pipes and fittings at specified grades and elevations
 - .4 Installation of Storm Sewer Services pipes and fittings at specified grades and elevations
 - .5 Installation of Water Services pipes and fittings at specified grades and elevations
 - .6 Installation of water service valves and other water service appurtenances
 - .7 Installation of catchbasins and manholes
 - .8 Installation of insulation around water service when passing sanitary service manhole.
 - .9 Sewer connections to existing manholes and sewer mains
 - .10 Water services connection to existing watermain

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00 - Quality Control:
 - .1 Submit to Contract Administrator testing results and report.
- .3 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

1.4 EXISTING CONDITIONS

- .1 Site soil report is attached to the end of this bid opportunity.
- .2 Buried services:
 - .1 Before commencing work verify and establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

- .3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
- .4 Record location of maintained, re-routed and abandoned underground lines.

1.5 SITE SERVICES - APPLICABLE SPECIFICATIONS AND DRAWINGS

- .1 These Specifications shall apply to the Work of this section.
 - .1 Unless otherwise stated, all site services and appurtenances shall be constructed in accordance with the latest edition of *The City of Winnipeg Standard Construction Specifications*.
 - .2 *The City of Winnipeg Standard Construction Specifications* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at:
http://www.winnipeg.ca/finance/findata/matmgt/std_const_spec/current/Standard_Construction_Specifications.pdf
- .2 The following Drawings are applicable to the Work of this section:
 - .1 C01 – Site Services
 - .2 C02 – Site Grading

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards (CSA International).
 - .1 CSA –A23.1/A23., Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2-02, PVC Sewer Pipe and Fittings (PSM Type).
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))
- .3 Canada Green Building Council (CaGBC)
 - .1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 SITE CONDITIONS

- .1 Examine sub-surface investigation report.
- .2 Known underground utility lines and buried objects are as indicated on Site plans.
- .3 Locate all irrigation system lines and any other underground utilities that may interfere with the Works. Ensure the location of all irrigation lines, sprinkler heads and other utilities are staked prior to the start of construction.

1.3 SUBMITTALS

- .1 Submit manufacturer's test data and certification at least 2 weeks prior to commencing Work.
 - .1 Certification to be marked on pipe.
- .2 Submit manufacturer's information data sheets and instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

1.5 PROTECTION

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, existing cart paths, surface or underground utilities which are to remain. Make good any damage.

- .2 The Contract Administrator or designated representative will designate the area or areas in which the Contractor's activities may take place. The Contractor shall make good any damage caused by their activities within the construction area or areas. The Contract Administrator or designated representative will designate access routes to the designated Work areas. The Contractor shall make good any damage caused by their activities along the access routes.

1.6 SUPERVISION AND INSPECTION

- .1 The Contractor shall provide preliminary staking for all drainage Works for approval by the Contract Administrator. The Contractor will stake all modifications approved by the Contract Administrator as Works are in progress.
- .2 The Contract Administrator or designated representative will provide periodic review of subgrade drainage installation as they are being undertaken and will provide direction to the Contractor.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away for public.
- .4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.
- .5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 MATERIALS

- .1 Plastic (HDPE) corrugated pipe and fittings: to ASTM D1248, Big "0", Prinsco (or approved equal in accordance with B7) Internal Snap Coupling System pipe perforated all around complete with polyester geotextile fabric 'sock' filter, nominal inside diameter 4" (100mm), nonperforated couplings (insert type), sleeves, reducers, connectors, T's, Wye's, elbows and end caps (insert type). Refer to Drawings for applicable pipe size and location.
- .2 Riverwash Drainage Stone: Non-calcareous, 19mm (3/4") diameter, rounded, smooth (not crushed) and washed, free from clay and silt fines. Soft limestones, sandstones or shale are not acceptable. Drainage material to consist of clean natural stone of similar characteristics having hard, strong, durable, uncoated particles free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter.
- .3 Coarse Drainage Sand: washed, (ASTM C-33).

- .4 Filter fabric: permeable, commercial grade, woven landscape fabric approved by Contract Administrator, to required widths x full lengths.
- .5 Root Barrier: For drainage trench/drain line protection. 46 x 61cm panels. Models: 18" (46cm) Universal Guide – UB 18-2. As manufactured by Deep Root (or approved alternate).

2.2 DRAINAGE SHEET

- .1 Drainage Sheet for Vertical and Horizontal application: High density polyethylene sheet, dimpled throughout field of sheet, with flat flange on manufactured edges; polypropylene filter fabric heat bonded to top of dimples.
 - .1 Product: Cosella-Dörken DELTA®-DRAIN (or approved equal in accordance with B7).
 - .2 Color: Brown
 - .3 Working Temperature Range: Minus 22 degrees F (minus 30 degrees C) to 176 degrees F (80 degrees C).
 - .4 Dimpled Thickness: 5/16 inch (8mm)
 - .5 Compressive Strength: ASTM D 1621: Approximately 5200 psf (250 kN/sq m)
 - .6 Water Flow Rate in Vertical Orientation: ASTM D 4716: 8.8 gal/min/ft (109 L/min/m)
 - .7 Water Flow Rate in Horizontal Orientation: ASTM D 4716: 2.4 gal/min/ft (30 L/min/m)
 - .8 UV Stability: 30 days maximum UV exposure, however cover as soon as possible
 - .9 Recycled Content: 60% post-consumer / post-industrial HDPE
 - .10 Sustainable Design: Virgin co-extrusion process, utilizing virgin polyethylene on the outside layers and recycled HDPE in the middle to provide long-term in situ performance.
- .2 Accessories (as recommended by product manufacturer's installation instructions):
 - .1 DELTA®-MOLD STRIP (or approved equal in accordance with B7).
 - .2 DELTA®-DRAIN PROFILE (or approved equal in accordance with B7).

2.3 BACKFILL MATERIAL

- .1 In accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
- .2 Excavated or graded material existing on Site may be suitable to use if approved by Contract Administrator.

2.4 SUBSTITUTIONS

- .1 Refer to Section B7 – Substitutes of Bid Opportunity 748-2013.

Part 3 Execution

3.1 EXAMINATION

- .1 Ensure graded base conforms with required drainage pattern before placing bedding material.
- .2 Ensure improper slopes, unstable areas, areas requiring additional compaction or other unsatisfactory conditions are corrected to approval of Contract Administrator.
- .3 Ensure foundation wall and dampproofing have been installed and approved by Contract Administrator before placing bedding material.

3.2 PIPE OR TUBING INSTALLATION:

- .1 Pipe trench and bedding:
 - .1 Drainlines: Cut trenches in subgrade, compact trench bottom. Excavation must not interfere with the normal 45° bearing splay of foundations.
 - .2 Remove boulders, old construction rubble, and other obstructions encountered in course of excavation.
 - .3 Shape trench and bed true to grade and to provide continuous, uniform bearing surface for pipe.
 - .4 Smooth to grade as indicated on grading plans, providing continuous grade without low or high spots.
 - .5 Pipe bedding not required.
- .2 Pipe laying:
 - .1 Ensure pipe interior and coupling surfaces are clean before laying.
 - .2 Lay pipe to minimum slope, as indicated on drawings, to discharge Site.
 - .3 Do not use shims to establish pipe slope.
 - .4 Use manufacturer's recommended fittings.
 - .5 Protect pipe ends and risers from damage and ingress of foreign material.
 - .6 Connect pipe to catch basins, sump pit or outlets by appropriate adapters manufactured for this purpose.
 - .7 Secure all joints and fittings with woven, commercial grade duct tape prior to backfilling.
- .3 Drainage Trench Backfill:
 - .1 Protect catch basin and other inlet structures from contamination of backfill and other material by placing a piece of filter fabric of rim and place lid in to secure fabric. Remove fabric after construction is complete.
 - .2 Place backfill material after pipe installation is approved by the Contract Administrator.
 - .3 Perforated Drainlines: Place coarse sand backfill by hand to finish grade, allowing for 75mm soil and sod over trench. Place layers uniformly and simultaneously on each side of pipe. Consolidate by hand, tamping lightly to design grade. Use appropriate devices or methods to ensure and prevent displacement of pipe during backfilling.

- .4 Place backfill material above pipe surround in uniform lifts not to exceed 150mm compacted thickness up to grades as indicated.
- .5 The Contractor is responsible to make good any settlement that may occur in pipe trenches.

3.3 DRAINAGE SHEET PREPARATION

- .1 Clean surfaces "broom clean" prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - .1 Remove projections larger than 1/4 inch (6 mm); remove sharp edges.
 - .2 In concrete and masonry, patch cracks and holes so that they provide suitable substrate as recommended by membrane manufacturer.

3.4 DRANAGE SHEET INSTALLATION

- .1 Install in accordance with manufacturer's recommended procedure.
- .2 Do not install when:
 - .1 Ambient temperature is below minus 22 degrees F (minus 30 degrees C).
 - .2 Concrete has been cured for less than 3 days.
 - .3 Standing water is present.
- .3 General Sheet Installation: Start at lowest point and Work to top, running length of sheets horizontally and overlapping upper sheets in shingle fashion at least 6 inches (150 mm); lap vertical joints at least 6 inches (150 mm).
 - .1 Install sheets without gaps, wrinkles, creases, or tears.
 - .2 Align and interlock overlapping layers.
 - .3 Secure to substrate at edges and in the field of the sheet using fasteners and methods recommended by sheet manufacturer; stagger fasteners in alternate rows.
 - .4 Flash and seal top edges, around openings and penetrations, and other locations recommended by manufacturer, in manner recommended by manufacturer.
- .4 Drainage Sheets: In addition to general sheet installation specified above:
 - .1 Install with cup side on side facing surface waterproofed.
 - .2 Unless otherwise indicated, fasten dimpled sheets using specified fasteners with dimpled washers interlocked with sheet at not more than 12 inches (305 mm) on center.
 - .3 At top, install with flat edge secured with DELTA®-DRAIN PROFILE. Fasten at not more than 8 inches (200 mm) on center.
 - .4 At all joints, apply continuous bead of sealant between layers and fasten through both layers with specified fasteners with dimpled washers.
 - .5 At vertical joints, overlap sheets at least 6 inches (150 mm) and interlock dimples, making full contact with sealant.

- .6 At horizontal joints overlap upper sheet over flat flange of lower sheet and fasten through both sheets at lower edge of upper sheet at 36 inches (910 mm) on center.
 - .7 At inside and outside corners, install sheet as close to substrate as possible without breaking and fasten along both sides entire length of corner, not closer than 5 inches (125 mm) to corner.
 - .8 At bottom of walls, extend a single sheet from wall over footing to drainage pipe.
- .5 Drainage Sheet: in addition to general sheet installation:
- .1 Install with protruding dimples and filter fabric on side facing away from the substrate, unless otherwise indicated.
 - .2 On lagging, pile, or earth forms, and other “blind” wall construction, install drainage sheet with filter fabric in contact with form; seal joints in dimpled sheet continuously with tape; anchorage to forms may be by adhesive if necessary.
 - .3 On low-slope split slab installations, install with filter fabric side up; seal dimpled sheets overlaps; anchor sheets sufficiently to prevent movement prior to and during installation of cover.
 - .4 At plaza deck, pavers are not to be installed directly on the drainage sheet. A buffer layer between the drainage membrane and the pavers must be installed. Install with filter fabric side up with butt joints rather than overlap joints.
 - .5 Use DELTA[®]-MOLD STRIP to enclose edges of drainage sheets; in fine silty clay soils, wrap exposed edges with filter fabric before installing DELTA[®]-MOLD STRIP.
 - .6 Cover sheet laps with filter fabric and do not leave dimpled sheet exposed.
 - .7 At bottom of walls, extend a single sheet from wall over footing to drainage pipe, if any.
- .6 Repairs to Dimpled Sheet: Apply patch made of same material interlocked, with continuous sealant bead around tear or penetration.
- .7 Repairs to Filter Fabric: Tape matching material over damaged area.
- .8 In blindside application, after installation of reinforcing bars, inspect drainage sheet and repair damaged sheet and fabric.

3.5 FIELD QUALITY CONTROL

- .1 Provide the services of a manufacturer's representative to inspect substrates for suitability for installation, to review procedures during construction, and to review the finished Work.

3.6 PROTECTION

- .1 Do not leave installed membrane exposed to sunlight for more than 30 days after installation; to cover, complete backfill operation or cover with protection board.
- .2 Prior to backfilling, inspect DELTA[®]-DRAIN for tears and other damage and repair.
- .3 Take care when backfilling to avoid damage to membrane; replace membrane damaged during backfilling.

- .4 Protect installed products until completion of project.
- .5 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION