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**Part 1            General**

**1.1                WORK INCLUDED**

- .1        The work for this section includes the supply, labour, materials and installation of all water service connections, curb stops and pipe.

**1.2                RELATED REQUIREMENTS**

- .1        Section 31 23 33.01 - Excavating, Trenching and Backfilling

**1.3                REFERENCES**

- .1        American National Standards Institute/American Water Works Association (ANSI/AWWA)
  - .1        ANSI/AWWA C500-[09], Standard for Metal-Seated Gate Valves for Water Supply Service.
  - .2        ANSI/AWWA C800-[05], Standard for Underground Service Line Valves and Fittings.
  - .3        ANSI/AWWA C900-[07], Standard for Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 Inch through 12 Inch (100 mm - 300 mm), for Water Transmission and Distribution.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-8.1-[88], Sieves, Testing, Woven Wire, Inch Series.
  - .2        CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
  - .3        CAN/CGSB-34.1-[94], Pipe, Asbestos Cement, Pressure.
  - .4        CGSB 41-GP-25M-[77], Pipe, Polyethylene, for the Transport of Liquids.
- .3        CSA International
  - .1        CAN/CSA-B137 Series-[09], Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
    - .1        CAN/CSA-B137.1-[09], Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
    - .2        CAN/CSA-B137.3-[09], Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.
  - .2        CSA G30.18-[09], Carbon and Steel Bars for Concrete Reinforcement.

**1.4                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Pipe certification to be on pipe.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in New Brunswick, Canada.
- .4 Samples:
  - .1 Inform Departmental Representative of proposed source of bedding materials and provide access for sampling at least 4 weeks prior to commencing work.
  - .2 Submit manufacturer's test data and certification that pipe materials meet requirements of this section [4] weeks minimum prior to beginning work. Include manufacturer's drawings, information and shop drawings where pertinent.

## **1.5 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit data to produce record drawings, including directions for operating valves, list of equipment required to operate valves, details of pipe material,.
  - .1 Include top of pipe, horizontal location of fittings and type, valves, valve boxes, valve chambers and hydrants.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect water distribution piping from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **1.7 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

## **Part 2 Products**

### **2.1 SERVICE CONNECTIONS**

- .1 Minimum 38mm Municipex (PEXa) meeting the latest requirement of CSA Standard B137.5, and ASTM F877.
- .2 Corporation main stops: Mueller, Ford, Cambridge or A. Y. MacDonald brass, meeting ASTM B62 with bronze ground key type with inlet end having the Standard Corporation Threads to AWWA C800 and outlet having copper or kitec compression type connection.
- .3 Curb boxes and stem for 38 mm services shall have a 25 mm upper section and be adjustable for a depth of bury 1.8m – 2.1, the model shall be Mueller Type A-728, Clow D2, or approved equal.

- .4 Boxes shall be located in accordance with the construction drawings, or as located in the field by the Departmental Representative. The service box shall be set directly over the corporation stop and installed plumb, supported by a piece of 50 mm x 200 mm x 300 mm block of preservative-treated wood (placed directly underneath on compacted soil or stone). Service boxes shall be set to finished grade, then adjusted to match existing grade.

## **2.2 PIPE BEDDING AND SURROUND MATERIAL**

- .1 Granular bedding and backfill: in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling unless otherwise noted on drawings.
- .2 Concrete mixes and materials required for bedding cradles, encasement, supports, thrust blocks: to Section 03 30 00 - Cast-in-Place Concrete.

## **2.3 BACKFILL MATERIAL**

- .1 In accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling, unless otherwise noted on drawings.

# **Part 3 Execution**

## **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for distribution piping installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of approval to proceed from the Departmental Representative.

## **3.2 PREPARATION**

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
  - .1 Inspect materials for defects to approval of Departmental Representative.
  - .2 Remove defective materials from site as directed by Departmental Representative.

## **3.3 TRENCHING**

- .1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling and in accordance with WorkSafe NB Trench Awareness.
- .2 Ensure trench depth allows coverage over pipe of 2.1 m minimum from finished grade.

## **3.4 GRANULAR BEDDING**

- .1 Place granular bedding material in uniform layers not exceeding 150mm compacted thickness to depth as indicated.

- .2 Do not place material in frozen condition.
- .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
- .4 Shape transverse depressions in bedding as required to suit joints.
- .5 Compact each layer full width of bed to 95 % minimum of corrected maximum dry density.
- .6 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

### **3.5 PIPE INSTALLATION**

- .1 Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and efficient execution of the work. All pipe fittings, etc., shall be carefully lowered into the trench in such a manner as to prevent damage to them. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.
- .2 All pipe and fittings shall be thoroughly inspected for defects before and after laying. Any defective or damaged pipe or accessory shall be removed from the site and replaced with sound material.
- .3 All foreign matter shall be removed from the interior of the pipe before lowering it into the trench. Trenches shall be kept free of water. The pipe shall be installed without earth entering the main. When the work is not in progress trench water and other foreign matter shall be kept out of the pipe by inserting an acceptable test plug or night cap in the end line. If water has accumulated in the trench, the plugs shall remain in place until the trench is dry.
- .4 Terminate building water service as 1.530m from foundation footprint at location shown on drawings and cap. Connection to new building to be completed by Building Mechanical.
- .5 Lay pipes to manufacturer's standard instructions and specifications.
  - .1 Do not use blocks except as specified.
- .6 Lay pipes on prepared bed, true to line and grade.
- .7 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .8 Do not lay pipe on frozen bedding.
- .9 Backfill remainder of trench.
- .10 The pipe shall be laid to the grade as indicated on the drawings. Deviations from these grades shall be permitted only upon written approval by the Engineer. The pipe shall be laid with no reverse grades, humps or sags not indicated on the drawings.
- .11 All tees, bends, valves and fittings on water mains shall be provided with joint restraints. Concrete thrust blocks in the locations and to the dimensions as indicated on the drawings. Thrust blocks shall extend to bear against undisturbed ground and shall be so placed that the pipe and fitting joints remain accessible.
- .12 End of main runs (stubs) will require at minimum a full length pipe past the fitting or valve, or an approved joint restraint system.

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### **3.6 VALVE INSTALLATION**

- .1 Install valves to manufacturer's recommendations at locations as indicated.
- .2 The valve box must be set and maintained in a vertical position over the operating nut and must be properly supported in place with the cover flush with finished grade. Drainage from the valve box will be provided by placing crushed rock around the valve. Covers on valve boxes shall be set flush with the finish grade.
- .3 Covers on valve boxes shall be set flush with the finish grade on paved roadways. On gravel roadways, the valve boxes shall be screwed down 100 mm after final inspection.

### **3.7 SERVICE CONNECTIONS**

- .1 Terminate building water service 1.530m from building foundation as shown on drawings. Connection to building to be made by Mechanical Contractor.

### **3.8 THRUST BLOCKS AND RESTRAINED JOINTS**

- .1 For thrust blocks: do concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Place concrete thrust blocks between valves, tees, plugs, caps, bends, changes in pipe diameter, reducers, hydrants and fittings and undisturbed ground as indicated or as described by Departmental Representative.
- .3 Keep joints and couplings free of concrete.
- .4 Do not backfill over concrete within 24 hours after placing.

### **3.9 INSULATION**

- .1 Insulation shall be installed in the locations as shown on the drawings and as directed by the Departmental Representative
- .2 Insulation shall be installed at the top of bedding level for a width of 1200 mm. The insulation shall be 50 mm thick unless otherwise noted on the drawings.
- .3 Joints between sheets of insulation shall be secured with an appropriate sheeting tape.
  - .1 Acceptable material: duct tape or approved equal
- .4 Insulation shall be covered with a minimum of 150 mm of bedding before backfilling.

### **3.10 BACKFILL**

- .1 Place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .2 Do not place backfill in frozen condition.
- .3 Under paving and walks, compact backfill to at least 95% maximum density to ASTM D698.
  - .1 In other areas, compact to at least 95 % maximum density to ASTM D698.

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**3.11 SURFACE RESTORATION**

- .1 After installing and backfilling over water mains, restore surface to original condition as directed by Departmental Representative.

**3.12 HYDROSTATIC AND LEAKAGE TESTING**

- .1 Do tests in accordance with ANSI/AWWA C600.
- .2 Pressure and leakage tests shall be applied to all new water mains including service laterals.
- .3 Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.
- .4 Notify the Engineer at least 24 hours in advance of proposed tests.
  - .1 Perform tests in presence of the Engineer.
- .5 Upon completion of pipe laying and after the Engineer has inspected Work in place, surround and cover pipes between joints with approved granular material placed to dimensions indicated.

**3.13 FLUSHING AND DISINFECTING**

- .1 Flushing and disinfecting operations: under direct control of the Departmental Representative.
  - .1 Notify the Departmental Representative at least 4 days in advance of proposed date when disinfecting operations will begin.
- .2 Disinfect and flush service connection prior to installation.
- .3 Once connection to existing water main has been completed, thoroughly flush service connection and take water sample.
- .4 Flushing flows as follows:

Pipe Size NPS	Flow (L/s) Minimum
6 and below	38
8	75
10	115
12	150
- .5 Open and close valves and service connections to ensure thorough flushing.
- .6 Perform bacteriological tests on water main, after chlorine solution has been flushed out.
  - .1 Take samples daily for minimum of two days.
  - .2 Samples will be taken by the Contractor with the presence of the Departmental Representative. Should contamination remain or recur during this period, repeat disinfecting procedure.
  - .3 Total residual chlorine present in the water used to disinfect the service lateral shall be reduced to a maximum of one part per million if released to an environment other than a sanitary or combined sewer pipe.

**END OF SECTION**

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**Part 1            General**

**1.1                WORK INCLUDED**

- .1        This section includes the supply of all labour, materials and equipment and incidentals necessary for the complete installation of all footing drains and discharge pipes as shown on the drawings.

**1.2                RELATED REQUIREMENTS**

- .1        Section 31 23 33.01 Excavating, Trenching and Backfilling.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations.
- .3        Samples:
  - .1        Inform Owner's Representative at least 4 weeks before beginning Work, of proposed source of bedding materials and provide access for sampling.
- .4        Certification: to be marked on pipe.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2        Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3        Storage and Handling Requirements:
  - .1        Store materials in accordance with manufacturer's recommendations.
  - .2        Store and protect pipes from damage.
  - .3        Replace defective or damaged materials with new.
- .4        Carefully lower pipes into trench in such a manner as to prevent damage to them. Under no circumstances shall culvert pipes be dropped into a trench.

**Part 2            Products**

**2.1                PLASTIC PIPE**

- .1        Polyvinyl pipe and fittings to ASTM D3034-80 and ASTM F679. Plastic pipe and fittings to CAN/CSA B-182.2-M90.
- .2        Foundation (Footing) Drain:

- .1 Foundation footing drains to be 150mm diameter perforated PVC pipe unless indicated otherwise on drawings. Drains to be surrounded with clean drainage stone and wrapped in fabric as detailed on the drawings. All fittings required to be PVC or compatible.
- .3 Outlet Drain
  - .1 Outlet drain to be 150mm diameter PVC pipe unless otherwise indicated on drawings.

## **2.2 PIPE BEDDING AND SURROUND**

- .1 Granular bedding and backfill material to Section 31 23 33.01 – Excavating, Trenching and Backfilling.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- .2 Prior to placing the pipe in the ditch or trench, inspect each pipe for defects. Remove all defective pipes from the site and replace with sound material. All dirt and gravel must be kept out of the joint and all gaskets kept clean.

### **3.2 PREPARATION**

- .1 Temporary Erosion and Sedimentation Control as per Section 01 35 43 - Environmental Protection Procedures.

### **3.3 TRENCHING**

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

### **3.4 BEDDING**

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place 150 mm minimum thickness of approved granular material on bottom of excavation and compact to 95% minimum of maximum density to ASTM D698.



- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Owner's Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

### **3.5 GENERAL**

- .1 Install new pipes according to the sizes, locations, and grades indicated on the drawings.
- .2 All adjustments of line and grade of pipes laid directly upon the bottom must be done by scraping away or filling in the backfill under the body of the pipe and not by blocking or wedging up.
- .3 Construct new pipe end treatments of the materials and to the dimensions shown on the Drawings. Place geotextile fabric around the pipe so as to make a tight connection that will not permit soil or debris to wash into the pipe.
- .4 Install pipes to manufacturer's recommendations and in accordance with recognized good practice. Provide and use proper implements, tools and facilities for safe and efficient execution of the work.
- .5 Inspect pipes in the field before and after laying. Remove any defective or damaged pipe and replace with new sound material at the Contractor's expense.
- .6 Remove and re-lay any pipe which is not in true alignment or shows any undue settlement after laying.
- .7 Until there is at least 300 mm of cover over new pipes, no walking on or working over them will be allowed, except as necessary for backfilling the trench and compaction of the bedding material.

### **3.6 BACKFILLING**

- .1 Backfill around and over pipes as indicated or as directed by Owner's Representative.
- .2 Place granular backfill material, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to 95% maximum density to ASTM D698 taking special care to obtain required density under haunches.
- .4 Protect installed pipes with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross.
- .5 Place backfill in unfrozen condition.

### **3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

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**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1       Division 01 - General

**1.2                REFERENCES**

- .1       American Society for Testing and Materials International (ASTM)
  - .1       ASTM D1056-07, Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
- .2       Canadian Standards Association (CSA International)
  - .1       CAN/CSA-A3000-No.08, Cementitious Materials Compendium. Includes:
    - .1       CAN/CSA-A5-98, Portland Cement
    - .2       CSA A23.1/A23.2-00(09), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
    - .3       CSA C22.2 No.211.1-06; Rigit types EB1, DB2 and ES2 PVC conduit.
  - .3       Health Canada/Workplace Hazardous Materials Information System (WHMIS)
    - .1       Material Safety Data Sheets (MSDS).

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1       Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2       Product Data:
  - .1       Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2       Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 43 - Environmental Procedures.
- .3       Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  - .1       Test reports: submit certified test reports for specified materials from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
  - .2       Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4       Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1       Packing, shipping, handling and unloading:

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 PVC DUCTS**

- .1 Rigid PVC ducts encased in reinforced concrete.

### **2.2 PVC DUCT FITTINGS**

- .1 Rigid PVC opaque solvent welded type couplings, bell end fittings, plugs, caps, adaptors as required to make complete installation.
- .2 Expansion joints.
- .3 Rigid PVC 5 degree angle couplings.

### **2.3 MARKERS**

- .1 Cable markers: as indicated, with words: "Cable", "Joint", "Conduit" impressed in top surface, with arrows to indicate change in direction of duct runs.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **3.2 INSTALLATION GENERAL**

- .1 Install underground duct banks including formwork.
- .2 Build duct bank on undisturbed soil or on well compacted granular fill not less than 150 mm thick, compacted to 95% of maximum proctor dry density.
- .3 Open trench completely between manholes before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.
- .4 Prior to laying ducts, construct "mud slab" not less than 75 mm thick.
- .5 Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.
- .6 Install base spacers at maximum intervals of 1.5 m levelled to grades indicated for bottom layer of ducts.

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- .7 Lay PVC ducts with configuration and reinforcing as indicated with preformed interlocking, rigid plastic intermediate spacers to maintain spacing between ducts at not less than 75 mm horizontally and vertically.
    - .1 Stagger joints in adjacent layers at least 150 mm and make joints watertight.
    - .2 Encase duct bank with 75mm thick concrete cover.
    - .3 Use galvanized steel conduit for sections extending above finished grade level.
  - .8 Make transpositions, offsets and changes in direction using 5 degree bend sections, do not exceed a total of 20 degree with duct offset.
  - .9 Use bell ends at duct terminations in manholes or buildings.
  - .10 Use conduit to duct adapters when connecting to conduits.
  - .11 Terminate duct runs with duct coupling set flush with end of concrete envelope when dead ending duct bank for future extension.
  - .12 Cut, ream and taper end of ducts in field in accordance with manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.
  - .13 Allow concrete to attain 50% of its specified strength before backfilling.
  - .14 Use anchors, ties and trench jacks as required to secure ducts and prevent moving during placing of concrete.
    - .1 Tie ducts to spacers with twine or other non-metallic material.
    - .2 Remove weights or wood braces before concrete has set and fill voids.
  - .15 Clean ducts before laying:
    - .1 Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.
  - .16 Duct cleaning:
    - .1 Pull 300 mm long x diameter 6 mm less than internal diameter of duct wooden mandrel through each duct, immediately after placing of concrete.
    - .2 Then pull stiff bristle brush through duct; avoid disturbing or damaging ducts where concrete has not set completely.
    - .3 Pull stiff bristle brush through each duct immediately before pulling-in cables.
  - .17 Install four 3 m lengths of 15M reinforcing rods, one in each corner of duct bank when connecting duct to manholes or buildings.
    - .1 Wire rods to 15M dowels at manhole or building and support from duct spacers.
    - .2 Protect existing cables and equipment when breaking into existing manholes.
    - .3 Place concrete down sides of duct bank filling space under and around ducts.
    - .4 Rod concrete with flat bar between vertical rows filling voids.
  - .18 Install pull rope continuous throughout each duct run with 3 m spare rope at each end.

### 3.3 MARKERS

- .1 Mark location of duct runs under hard surfaced areas not terminating in manhole with railway spike driven flush in edge of pavement, directly over run.

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- .1 Place concrete duct marker at ends of such duct runs.
  - .2 Construct markers and install flush with grade.
  - .2 Mark ducts every 150 m along straight runs and changes in direction.
  - .3 Where markers are removed to permit installation of additional duct, reinstall existing markers.
  - .4 Lay concrete markers flat and centered over duct with top 25 mm above earth surface.
  - .5 Provide drawings showing locations of markers.

### **3.4 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspections:
  - .1 Inspection of duct will be carried out by Engineer prior to placing. Placement of concrete duct and duct cleanout to be done when Engineer is present. Minimum 48 hours notice to Engineer prior to pouring concrete.

### **3.5 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**