

## APPENDIX "A"

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### **SPECIFICATION: Sewer Relining**

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#### **1. GENERAL CONDITIONS**

The General Conditions, Labour Conditions and the Bidding Requirements are hereby made part of this section. The curing and installation methods of liner shall be described and included with the bids. The Contractor shall demonstrate that the method is applicable and that his experience in using the method is proven.

#### **2. GENERAL REQUIREMENTS**

- 2.1 The General Contractor shall comply with all applicable bylaws, rules and regulations of local and provincial authorities and pay for all licenses and fees associated with the work. The bidder shall be properly licensed and trained for cured-in-placed pipe lining processes, and will submit the certification with their bid.
- 2.2 Where not otherwise stated or specified, the work shall conform to at least the minimum standards of the latest versions of the National Building Code and Municipal and local building, electrical and plumbing codes
- 2.3 Protect the property during the course of the work and make good at no extra cost to, and to the satisfaction of, the Government of Canada, any damage caused throughout the performance of the work.
- 2.4 Nothing contained herein shall relieve the Contractor from completing the pipe rehabilitation in the most feasible, efficient and safe manner, using required materials to the lines and grades shown on the plans and to the requirements of these specification.

#### **3. STORAGE FACILITIES**

The General Contractors shall be responsible for, and arrange for, their own storage facilities.

#### **4. WORKMANSHIP**

- 4.1 Workmanship is to be of the best quality throughout and be executed in accordance with the best standard practice and all applicable codes.
- 4.2 Work of all trades shall be completed by qualified journeyman tradesmen.

## 5. INTERPRETATION OF SPECIFICATIONS

- 5.1 The manufacturer/General Contractor shall, before close of tender, bring to the attention of the Government of Canada the omission of an item which is obviously intended to be required for a complete job. Failure to cooperate in this respect will not relieve the manufacturer/General Contractor of the responsibility of completing the work in accordance with the standard of the contract as though it has been properly incorporated in the documents.
- 5.2 In case of doubt as to the intention of the specifications, request clarification before proceeding. Should the specifications call for any items which are either impractical or impossible, the contractor is required to obtain instructions from the Government of Canada before proceeding, otherwise the Government of Canada will assume that all work can be carried out in an acceptable manner.

## 6. MATERIALS

### 6.1 Fiberglass Mat System or equivalent

- 6.1.1 Fiberglass Mat System or equivalent (If Contractor requests to use an equivalent system, the bidder shall provide a sample prior to start of work and the sample must be approved by the Government of Canada. ASTM F1216-98 liner is considered an acceptable alternative.) The tube shall be composed of a high strength, fiberglass mat system capable of retaining resin, contained within a system of polyethylene film. The tube shall have sufficient needling and cross lapping to yield a minimum burst strength of 800 pounds per square inch in transverse directions (hoop stress), and strength to withstand the installation pressures and curing temperatures. The tube shall be free from tears, holes, cuts, foreign materials and other defects, and will be subject to inspection by the Government of Canada. Reduction of pipe size shall not exceed 3/4" cross sectional (diameter). The outside diameter of the tube being inserted shall be properly sized to allow for expansion so that the Cured-In-Place Pipe liner can fit tightly against the host pipe. The tube shall be installed through the existing manholes, in accordance with the manufacturer's recommendations and procedures. The finished pipe on mainline reaches shall be continuous over the entire length between manholes. During the curing process, the Contractor shall keep logs, charts and/or graphs of the liner temperatures at the upstream and downstream manholes to insure that proper temperatures and cure times have been achieved. These documents may be required by the Government of Canada at any time during and after the curing process, with a copy being submitted to the Government of Canada at the completion of the contract. The beginning and end of the cured-in-place pipe shall be cut flush at the inlet and outlet points in the manhole by using a rotary cutter Burr free.
- 6.1.2 Contractor is to provide any and all specs with a sample for each product proposed.

## **6.2 Resin/Catalyst**

- 6.2.1 The resin used shall be compatible with the rehabilitation process used, and designed for a wastewater environment. The resin shall be able to cure in the presence or absence of water, and the initiation temperature for cure shall be recommended by the resin manufacturer and approved by the Engineer. The resin shall have sufficient thixotropic properties to obtain non-draining characteristics when impregnated into the fiber fabric.
- 6.2.2 The wet-out procedure shall utilize the resin and catalyst in sufficient quantities to ensure complete impregnation of the liner and provide the properties specified Finished and Cured Liner Properties.
- 6.2.3 The catalyst system shall be compatible with the resin and other materials to be utilized in the rehabilitation process. Quantity and type of catalyst shall be selected based on the curing conditions and recommendations of the resin manufacturer.

## **6.3 Material Disposal**

All materials not required for reuse shall become the property of the General Contractor and are to be removed from the site and disposed of in an environmentally safe manner.

## **6.4 New Material**

All materials used in this contract shall be new unless otherwise specified, and in accordance with the specifications.

## **7. LINER DESIGN CRITERIA**

The Cured-In-Place Pipe thickness shall be calculated and designed upon the following physical conditions of the existing pipe to be rehabilitated:

- 7.1 All pipes shall be considered partially deteriorated
- 7.1.2 All pipes shall be subjected to a soil load of 120 lbs./cu. ft., with applicable live load, and water table two (2) feet below the top of the ground
- 7.1.3 Pipes in good condition shall have a minimum of 2% ovality in the circumference. A higher value of ovality shall be used if the pipe is deteriorated
- 7.1.4 Factor of safety (N) of 2.0 shall be used for calculations
- 7.1.5 The contractor shall measure the inside diameter of the existing pipe in the field so that the pipe can be lined in a tight fitted condition

## **8. METHOD OF WORK**

- 8.1 Schedule the work with the Departmental Representative.
- 8.2 Maintain service to buildings with no interruptions.
- 8.3 Any work requiring obstruction of a roadway, must have 48 hours notice to the Project Manager. Local traffic to have access at all times. Roadway to be closed only by special request.
- 8.4 Time of Completion – Begin project work as soon as possible after award of contract and complete within four (4) weeks.

## **9. SCHEDULING OF WORK**

- 9.1 All work is to be scheduled with the Departmental Representative and completed during normal working hours, Monday to Friday, unless facility usage prohibits work during this time. Any alternative schedule is to be discussed and approved by the Departmental Representative.
- 9.2 A reasonable completion date is to be provided as part of the bid and adhered to, with the exception of unforeseen circumstances.

## **10. CLEAN UP**

- 10.1 During the performance of the work, keep all affected areas tidy.
- 10.2 Upon completion of the work, leave the area clean and tidy, with all equipment in the original location.
- 10.3 The contractor must provide their own waste disposal and may not dispose of construction debris in the owner's receptacles.

## **11. WARRANTY**

The Contractor shall provide to the Government of Canada a warranty to be in force and in effect for a period of ONE (1) year from the date of acceptance by the Government of Canada. Guarantee the quality of workmanship and material for a period of one year from the date of acceptance of the work. Make good at no extra cost to, and to the satisfaction of, the Government of Canada, any defects that may develop within the warranty period.

## **12. SECURITY SCREENING REQUIREMENTS**

The Contractor's personnel require security clearances and will be subjected to a criminal record name check. Therefore, the successful contractor will be required to provide the Government of Canada with the full name, address, and birth date of all employees who will be working at the site. Time also must be afforded daily for the issuing of visitor tags. The Government of Canada will provide security escorts, the contractor must advise the project manager in advance as to when he will be working on-site.

## **13. SCOPE OF WORK**

- 13.1 To furnish and install, complete in place, a fiberglass (or other material approved by the Crown's in-house plumber) cured-in-place pipe (CIPP) for rehabilitation of existing sanitary and storm sewers and revitalization of manholes. The Contractor shall provide all materials, labor, equipment, and services necessary to bypass pumping of sewage flows in mains. Cured-in-place pipe shall be as specified and installed at the locations shown on the drawings.

**SANITARY:**

**TP1**

6" Range to 5A

MH5A, MH6A, MH7A, MH8A, MH9A (54") reline

On site video inspection and report # DM3, DM4, DM5, DM6, DM7

**TP2**

MH1A under the street to new MH where Dorm 2 is located (10" across Shaw East to West)

MH1A

On site video inspection and report # DM1

**APS**

MH15, MH16, MH17, MH18 reline

On site video inspection and report # DM13, DM14, DM15, DM16

**STORM:**

**TP3**

E9 & E10 Trailers to Shaw

CBMH1, CBMH2, CBMH3, CBMH4, MH5 reline

On site video inspection and report # SM1, SM2, SM3, SM4

**TP4**

**RE: Benching - Manhole Revitalization**

- New ladder Rungs

- line barrel

- Bench pipe along with bottom of barrel (Shot crete is an acceptable alternative)

MH1A, MH15, MH16, MH17, MH18

On site video inspection and report # DM1, DM13, DM14, DM15, DM16

CBMH1, CBMH2, CBMH3, CBMH4 reline

On site video inspection and report # SM1, SM2, SM3, SM4

13.2 Installation of by-pass pumping equipment shall be complete and operational. Layout of a temporary by-pass pumping system to isolate the working area should take into account the location of pumps and pipes, possible pump failure contingency and avoidance of blocking areas of the Academy. All costs for this must be included in the bid price.

13.3 The contractor shall furnish, install and operate pumps, plugs, conduits and other equipment to divert the flow of sewage around the pipeline reach in which work is to be performed. The plug shall be provided with a tag line. The pumping system shall be of sufficient capacity to handle existing flow plus additional flow. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.

13.4 All existing service connections to be reinstated at existing diameter line size(s).

13.5 The Contractor shall submit, before award:

- 1) A Manufacturer's recommendations for the installation of the lining including resin application, curing process details (including temperature control), storage procedures, service connection methods, trimming and finishing, and quality control measures to be used for the cured-in-place pipe lining of mainlines and services.
- 2) A Certification from the manufacturer(s) to confirm the installer is licensed to perform the work
- 3) Television inspection reports and video tapes made prior and after pipe insertion
- 4) A sewage bypass pumping and/or diversion plan for waste sewage prior to pipe installation. The Contractor's plan for sewage bypass pumping and/or diversion shall be satisfactory to the Government of Canada Plumbing Shop before the Contractor shall be allowed to commence sewage bypass pumping and/or diversion.

### **13.6 Process Description**

- 13.6.1 The rehabilitation of existing sanitary sewer lines by Cured-In-Place process includes reconstruction of the existing lines by forming a new pipe within the existing, structurally deteriorated pipe which has generally maintained its original shape. Installation of the Cured-In-Place Pipe shall be accomplished by the use of a winched-in application. The reconstruction of the existing line shall be accomplished by installing a flexible tube which is first impregnated with a thermosetting resin. The tube is pulled into the pipeline from manhole to manhole using mechanical equipment (winch). After full insertion, the tube is cured by circulating hot water or introducing controlled air or steam throughout the length of the tube to cure it into a hard, impermeable pipe. This "pipe" shall extend the full length of the original sewer, and shall provide a structurally sound, jointless, tight-fitting, water-tight pipe within a pipe.
- 13.6.2 Manhole and sewer pipe depth would have to be measured on site.
- 13.6.3 Cleanup and restore existing surface condition and structures.
- 13.6.4 Responsible for proper and accurate installation of the new sewer pipe, regardless of the method describe in this section and the following subsections.
- 13.6.5. Supply all labor, materials, equipment and apparatus not specifically mentioned herewith or noted on the plans, but which are incidental and necessary to complete the work specified.

## **14. GENERAL NOTES**

- 14.1 Water to be supplied by the Government of Canada. Dumping point will be designated on site by the Government of Canada for domestic waste water. On site water service may only be used if the fire hydrant is protected by double check back flow preventer, and the fire hydrant is protected from freezing. To be provided and monitored by the Contractor.
- 14.2. If the equipment jams in the line, the Contractor is responsible to remove it.

- 14.3 The Contractor is responsible for snow removal, if required, in order to complete this project.
- 14.4 Contractor responsible for all removal and disposal of construction material and debris **each** day. It is imperative that this space is kept clean and suitable as a healthy living, training, and work space.
- 14.5 The Government of Canada Plumbing Shop Supervisor or Lead Plumber will oversee all work.

## **15. CODE AND REFERENCE MATERIALS**

The following documents form a part of these specifications to the extent stated herein, and shall be the latest edition thereof. Where differences exist between codes and standards, the one affording the greatest protection shall apply.

### **15.1 REFERENCES**

- 15.1.1 American Society for Testing and materials (ASTM):
  - ASTM F2019-03  
Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured in place Thermosetting Resin (CIPP)
  - ASTM D 256  
Standard Test Methods for Impact Resistance of Plastic and Electrical Insulating Materials
  - ASTM D 543  
Resistance of Plastic to Chemical Reagents
  - ASTM D 638  
Tensile Properties of Plastic
  - ASTM D 732  
Standard Test Method for Shear Strength of Plastics by Punch Tool
  - ASTM D 790 Flexural Properties of unreinforced and Reinforced Plastic and Electrical Insulating Materials
  - ASTM D 2990  
Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
- 15.1.2 Federal Water Pollution Control Act of 1972 (FWPCA): As Amended
- 15.1.3 National Association of Sewer Service Companies (NASSCO):  
Recommended Specifications for Sewer Collection System Rehabilitation
- 15.1.4 Floor plans will be provided for review. These plans will be for reference based or report made by ACME only and may not be entirely accurate.

### **15.2 CONSTRUCTION SAFETY MEASURES**

- 15.2.1 Observe construction safety measures of National Building Code 1995, Provincial Government Workers/Workmen Compensation Board and municipal authority provided that in any case of conflict or discrepancy the more stringent requirements are to apply.
- 15.2.2 Comply with requirements of FCC N. 301
- 15.2.3 Successful bidder must submit a copy there safety plan to the Government of Canada.

### **15.3 OVERLOADING**

Ensure no part of work is subjected to loading that will endanger its safety or will cause permanent deformation.

### **15.4 WHIMS**

15.4.1 Comply with requirements of Workplace Hazardous Materials Information System (WHIMS) regarding use, handling, storage, and disposal of hazardous materials; with labeling and provision of material safety data sheets acceptable to Labour Canada and Health Canada.

15.4.2 Deliver copies of WHIMS data sheets to the Departmental Representative on delivery of materials.

## **16. APPENDICES**

16.1 Sewer inspections reports from ACME

16.2 Photos of sewers

16.3 Maps

16.4 Video (disk supplied on request)