

**1. GENERAL**

1.1 RELATED SECTIONS

- .1 Section 31 23 00 – Excavation, Trenching and Backfilling.
- .2 Section 33 14 13 – Watermains.
- .3 Section 33 14 17 – Building Services.
- .4 Section 33 31 11 – Sewer Mains.

1.2 COMPLIANCE REQUIREMENTS

- .1 Contractors are required to comply with applicable legislation, regulations, acts, codes, and policies, including, but not limited to the Alberta and Saskatchewan Occupational Health and Safety, Worker’s Compensation Board Standards, industry standards, and municipal requirements while completing horizontal directional drilling operations.
- .2 In any case of conflict or discrepancy, the higher standard shall apply.

1.2 PIPE BURSTING

- .1 Design
  - .1 Submit methodology specific to each section, design, and construction details for the proposed pipe bursting operation.
- .2 General Description
  - .1 A tool whose outside diameter is greater than the maximum inside diameter of the existing pipe is drawn through the existing pipe, breaking it into small fragments and driving the broken pieces into the surrounding soil.
  - .2 The tool makes a void along the path formerly occupied by the existing pipe and simultaneously pulls the new pipe into place.
  - .3 The tool shall be of dimensions such that the design maximum diameter of the space created shall not exceed the maximum outside diameter of the new pipe by more than fifteen (15) percent.
  - .4 The installation procedure shall make the invert of the new pipe lower than the original invert by half the difference between the inside diameters of the old pipe and the replacement pipe.

1.2 WORK CONTENT

- .1 Includes all consulting services, plant, labour, material, and services for the following:
  - .1 Preparation of the pipes for accepting the bursting tool and new pipe. This includes CCTV inspection, flushing, and cleaning the pipe, and may include review of existing CCTV tapes, service records and plans. A recent CCTV is available for viewing from the Engineer.
  - .2 Installation of a new pipe by the pipe bursting process.
  - .3 Isolation of the pipe during rehabilitation and maintaining servicing to users by an approved method.
  - .4 CCTV inspection of the rehabilitated pipe.

1.3 CONSTRAINTS

- .1 Maintain temporary service during construction.
- .2 Schedule work to minimize interruptions to existing services.

1.4 SUBMITTALS

- .1 The Contractor is required to submit the following within five (5) working days of award of contract:
  - .1 Detailed specifications of proposed pipe bursting method.
  - .2 Complete methodology specific to each pipe section requiring rehabilitation.
  - .3 Complete details about component materials, their properties, and installation procedures.
  - .4 Schedule of work.
  - .5 Drawings and description of excavation locations.
  - .6 Access shaft or pit excavation shoring design stamped by a professional consultant registered with either APEGS or APEGA depending on the location of the work.
  - .7 Method of dealing with existing pipe sections which may be partially/fully encased in concrete bedding.
  - .8 Manufacturer's test data and certification that the pipe materials meet the requirements of this section.
  - .9 The proposed method of maintaining services or providing alternate facilities, for approval by the Engineer.
- .2 At least two (2) weeks prior to commencing the Work submit to the Engineer data from the manufacturer regarding the tensile strength and recommended maximum bending radius of the pipe to be installed.
- .3 The Contractor shall not change any material, thickness, design values or procedural matters stated or approved in the submittals without the Engineer's prior knowledge and approval.

1.3 MEASUREMENT AND PAYMENT

- .1 Pipe installed in a pipe bursted hole will be measured in a horizontal plane in metres from centre to centre between manholes or from a required initiation to a required termination point, where applicable, as specified within the Bid Forms. Payment shall be compensation in full for all equipment, materials, tools, labour and supervision, saw cutting, excavation of entry, exit, reaming operations, pipe inspection by televising, other testing, dewatering, pipe supply, assembly and installation, proper disposal of spoils and other fluids, backfill, compaction as specified and road restoration, unless otherwise specified within the Bid Form, and all other items deemed incidental to the satisfactory completion of the Work.
- .2 Include in the unit rates within in the Bid Forms the cost of all consultants, plant, labour and supervision, material and services for the following:
  - .1 Preparation of the site including removal of vegetation, verifying the location of all existing utilities along the proposed alignment, locating and daylighting of all utility crossings, and excavation of entry and exit pits.

- .2 Testing of the installed section in accordance with the applicable technical specifications and restoration of all disturbed surfaces to their pre-construction conditions, unless otherwise accounted for within the Bid Forms or directed by the Engineer.

## **2. PRODUCTS**

### 2.1 POLY-VINYL CHLORIDE PIPE (PVC)

- .1 The PVC pipe used for pipe bursting shall be manufactured with a cast iron outside diameter (CIOD) and shall be made to the requirements of AWWA C900 for diameters between 100mm and 300mm. This pipe will be a restrained joint PVC pipe system TerraBrute AWWA C900 PVC SDR18 conforming to the latest edition of CSA B137.3, or an approved equivalent.
- .2 A Certificate of Compliance with the specifications shall be furnished by the pipe supplier.
- .3 The pipe dimension specified on the drawings is the inside diameter (I.D.) required for the pipe hydraulics. If the Contractor proposes alternative pipe materials or pipe diameters (I.D. or O.D.), then the Contractor must submit details to the Engineer for review and approval.
- .4 The pipe shall be free from visual defects such as foreign inclusions, concentrated ridges, pitting, discoloration, varying wall thickness and other deformities.

### 2.2 CLAMPS

- .1 Where excavations for the insertion of the replacement pipe are made between two (2) manholes, the ends of the new pipe shall be cut smooth and square to the axis of the pipe so that both ends meet and touch uniformly and continuously with the existing pipe. A stainless steel full circle universal clamp coupling with a 6mm minimum thickness grid type gasket shall be used to join the new pipe to the existing pipe.
- .2 Select clamps to fit the outside diameter of the replacement pipe. Minimum clamp widths shall be 750mm for pipe outside diameters greater than 300mm.
- .3 Any alternate coupling system must be submitted to the Engineer for review and approval.

### 2.3 OTHER PIPE MATERIALS

- .1 Where the Contractor proposes to use other pipe materials in a pipe bursting application, the Contractor shall submit details to the Engineer for review and approval.

## **3. EXECUTION**

### 3.1 INSTALLATION PROCEDURE

- .1 Inspection and Cleaning of Existing Pipes
  - .1 Review all available CCTV tapes and record plans.
  - .2 Inspect the interior of the pipe carefully using CCTV or other means to determine the existence of any conditions that may prevent completion of the pipe bursting process.
  - .3 Obtain adequate information to complete the design and execution of the rehabilitation scheme.

- .4 Clean the pipe to a degree that is required for the proper completion of the pipe bursting process.
- .5 Dispose of debris removed from the pipe by an approved method at an approved location.

### 3.2 PRE-COMMENCEMENT

- .1 Notify owners of subsurface utilities along and on either side of the proposed pipe bursting path of the impending Work. All utilities along and on either side of the proposed pipe bursting path are to be located prior to commencing the Work. Confirmation of notification shall be submitted to the Engineer prior to the initiation of any pipe bursting operations.
- .2 All utility crossings shall be exposed using hydro-excavation, hand excavation or another approved method to confirm depth.
- .3 Excavations for entrance and exit pits are to be of sufficient size to avoid a sudden radius change of the pipe and resultant excessive deformation.

### 3.3 BYPASS FLOW IN SEWER LINES AND SERVICE CONNECTIONS

- .1 Provide a detailed scheme to deal with mainline flows for the Engineer's review and approval, taking into account the following:
  - .1 Pumps and bypass lines shall be of adequate capacity to handle the peak flows and ensure that no upstream flooding occurs during construction.
  - .2 Equipment shall conform to the applicable noise bylaws.
  - .3 Allow for continuous monitoring of water levels in upstream and downstream manholes. Ensure that there is no contamination of basements, ditches, roadways, sidewalks, etc. with water, treated or otherwise, as may be conveyed in the pipe being rehabilitated. In the event of such contamination, immediate action shall be taken to close the source of contamination. Proper clean-up of the affected area shall be followed, and no work shall commence until a re-evaluation of the complete process has been carried out by the Engineer. No rehabilitation work shall commence unless authorized by the Engineer. No extra payment shall be made due to the Contractor for decontamination, clean-up, or down time caused by surcharging events during the rehabilitation process.
- .2 All service connections attached to the existing sewer shall be completely disconnected and isolated from the existing sewer before pipe bursting operations are initiated.
- .3 Provide detailed proposals for dealing with flows in existing service connections.

### 3.4 LINE OBSTRUCTIONS

- .1 Clean the line of obstructions such as solids, roots, sediments, protruding service connection, encrustations, or collapsed pipe that will prevent the completion of the pipe bursting process.
- .2 If pipe cleaning or obstacle removal methods cannot remove an obstruction, a point repair excavation shall be made prior to initiating the pipe bursting operations to uncover and remove or repair the obstruction. Written approval from the Engineer is required prior to undertaking this work.

- .3 The Engineer shall make every effort to identify such locations during tender time after reviewing available CCTV tapes and record plans. No extra payment shall be made for removal of obstructions that in the opinion of the Engineer were adequately identifiable at tender time.

### 3.5 SAGS IN LINE

- .1 If the CCTV inspection reveals a sag in the existing pipe, the contractor shall define the degree to which the sag may not be reduced by the pipe bursting process.
- .2 Undertake the necessary measures to reduce existing sags by the pipe bursting process or locate the intersection/access pits such that the sag location is exposed, and the bottom of the pipe trench is raised to provide a uniform grade in the line with the new pipe invert.
- .3 No new sags or accentuation of existing sags outside of the limits defined under Section 3.9 Acceptance shall be accepted.
- .4 Take all measurements required to repair new sags deemed as unacceptable, including, if necessary, excavating a pit and bringing the bottom of the trench up to a uniform grade in line with the invert of the adjacent pipes.

### 3.6 INSERTION OR ACCESS PITS

- .1 The location and number of insertion or access pits shall be determined by the Contractor and submitted in writing for review and approval by the Engineer prior to commencement of work.
- .2 Unless otherwise stipulated, the pits shall be located such that their total number shall be minimized, and the length of replacement pipe installed in a single pull is maximized.
- .3 Locations of damaged pipe or sags shall be used for intersection/access pits if directed by the Engineer.

### 3.7 INSTALLATION OF REPLACEMENT PIPE

- .1 As the pipe bursting is advanced through the existing pipe, the replacement pipe shall be advanced directly behind the tool to fill the void left by the shattered pipe.
- .2 The installation of the replacement pipe shall not damage other underground utilities in the vicinity. The Contractor shall be responsible for making good any damage incurred.
- .3 Replacement pipe with gashes, nicks, abrasions, or any such physical damage which are larger/deeper than ten (10) percent of the wall thickness shall not be used and shall be removed from the construction site.
- .4 The installation replacement pipe shall be continuous over the entire length, from manhole to manhole, or in the case of a water line from appurtenance to appurtenance.

### 3.8 SERVICE CONNECTIONS

- .1 After the replacement pipe has been completely installed and tested; all services shall be reconnected to the replacement pipe.

- .2 The utmost care shall be exercised in the tapping of the rehabilitated pipe for the connection, in order to ensure that no damage is caused to the rehabilitated pipe.
- .3 The connection to the rehabilitated pipe shall be by means of an approved field connection. The connection and any joints between the service and the rehabilitated pipe shall be structurally sound and watertight.
- .4 The service connection pipe shall not protrude into the rehabilitated pipe.

### 3.9 ACCEPTANCE

- .1 On completion of the replacement pipe installation, arrange for CCTV camera inspection and provide:
  - .1 Video tapes for the entire pipe installation.
  - .2 Inspection report and log sheet between each manhole.
- .2 The installation pipe invert in areas where sags were not previously identified shall not deviate from the given grade by an amount greater than the total of 25mm plus 20mm per meter or diameter of rehabilitated pipe.

### 3.10 SURFACE TOLERANCES

- .1 The Contractor shall ensure that the possibility of ground settlement is reduced to a minimum underneath any roadway within or near the pipeline alignment. Surface settlements shall not exceed 10mm over a 3.0m straight edge for the period from construction start to end of the Warranty Period.
- .2 The contractor shall ensure that the possibility of ground bulging is reduced to a minimum underneath any roadway within or near the pipeline alignment. Surface bulging shall not exceed 10mm of a 3.0m straight edge for the period from construction start to end of the Warranty Period.
- .3 Should settlement or bulging exceed the specified tolerance, the Contractor shall make the necessary surface grade correction. The method of correction shall be approved by the Engineer. All surface restoration costs shall be borne by the Contractor.
- .4 If through the Warranty Period, settlements and bulging outside a roadway alignment within or near the pipeline alignments installed through the pipe bursting method are identified, these areas shall be reviewed by the Engineer and a determination made with respect to the severity and remediation measures required. At a minimum nominal settlement and bulging outside of the pipeline alignments, within 50mm above or below the original ground surface, will be deemed acceptable permitted that positive surface drainage is maintained. Settlements or bulging in excess of this will be deemed a deficiency to the Contractor and will require immediate remediation, unless otherwise directed by the Engineer. All surface restoration costs shall be borne by the Contractor.

### **END OF SECTION**