

1.0 GENERAL

1.1 Scope

1.1.1 The work covered by this section involves the cleaning and Closed Circuit Television (CCTV) inspection of sanitary and storm sewer mains.

1.2 CCTV Operator Certification

1.2.1 The CCTV operator shall be trained and certified to the NASSCO PACP/CSA Plus 4012-10 standard. Documentation shall be submitted prior to start of CCTV inspection operations and within fourteen (14) days of award.

1.3 Related Sections

1.3.1 Section 1300 – Sewer Mains

1.3.2 Section 1320 – Sewer Main Testing

2.0 EQUIPMENT

2.1 CCTV inspection equipment shall consist of solid state cameras capable of providing clear, well illuminated digital recording of the interior of the sewers. It should consist of a monitoring unit with pan, tilt and zoom capabilities (or digital equivalent). This equipment shall be specifically designed and constructed for such inspection purposes and shall be capable of providing a clear digital recording of the interior of the sewers. An inclinometer, which gives a profile of the pipeline, shall be used for all new sewer pipe inspections or on existing sewer pipe if directed by the Engineer.

2.2 High velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of nozzles capable of scouring the interior of the size range of sewers indicated in the Form of Tender.

2.3 Debris removal equipment shall consist of a vacuum tanker unit capable of removing typical sewage debris accumulated by the sewer cleaner at the manholes.

2.4 Solid debris cutting equipment shall be hydraulically driven by the sewer cleaner. The equipment must have circular saw-tooth blades in sizes consistent with the sewer being cleaned.

3.0 CCTV INSPECTION REPORTS

3.1 Video inspection reports shall be submitted on a hard drive containing the CCTV report, database, and video files. Database submissions shall be submitted as one database containing all information pertaining to the individual pipe sections (JumpGISID). This video inspection report shall be in accordance with NASSCO PACP/CSA Plus 4012 defect codes and processes.

3.2 Unless otherwise specified, at least three sample inspection reports, defect database, and video files shall be submitted for review prior to starting the project. The report and defect database shall be records of the exact location of each leak or fault discovered by the inspection - e.g. open joints, broken, cracked, deformed or

collapsed pipe, presence of grease, roots, debris, accumulation, obstruction, infiltration, water depth variations and other points of significance. Video inspection reports shall be submitted as a Defect Database created in the standard NASSCO format through the use of a PACP certified software program.

- 3.3 All video files shall be in digital MPEG 4 format for each pipe segment inspected, unless specified otherwise by the City. Video resolution must be equal to or exceed a minimum resolution of 420 lines with an NTSC size of 720 x 480 at a frame rate of 29.97 frames per second. Recorded picture quality and definition shall be to the satisfaction of the City.
- 3.4 All submitted video files shall follow the naming convention of PipeID_StartStructureID_Datetime.mp4, as shown in the following example: 1038_8040_201006211320

Date time - YYYYMMDDHHMM

- 3.5 Each manhole-to-manhole section of pipe shall be located on the report form in such a way as to be readily identifiable. Identify such items as pipe section (JumpGISID), street names, manhole numbers, type of pipe, joint length, direction of flows, pipe diameter, manhole depth, inspection date, names of the inspection technician, and video identification numbers.
- 3.6 Coding and quality control for reports will follow CSA Plus 4012-10 standards unless specifically stated otherwise by the City. In addition, defect information will be overlaid as text in the video to assist with inspection review. Inspections shall ascertain both operational and structural pipe condition. A sample of the inspection report, video file and database shall be submitted for review prior to starting inspections and within fourteen (14) days of award.
- 3.7 Digital copies of the final CCTV report and defect database with corresponding video shall be provided to the City within two weeks after the completion of the inspection. Media submitted shall become the property of the City.
- 3.8 Submission of quality control for review by the City to determine acceptability shall be determined by accuracy and quality.
- 3.8.1 Header section shall be expected to meet an accuracy level of 95%. Data section shall be expected to meet an accuracy level of 85%.
- 3.8.2 Quality shall be determined by the factors of:
- a) Camera positions, camera speed, lighting, linear measurements, and cleaning and flushing shall all follow the procedures and processes described by CSA Plus 4012-10.
 - b) Focus and clarity: It is required that a line resolution chart, colour resolution chart and linearity chart be submitted at the beginning prior to the start of inspection.
 - c) Should an inspection fail either the required accuracy or quality, it

shall be re-inspected, recorded and re-submitted. In addition, the video quality and coding of the five inspections done immediately before and after shall be checked. This process shall continue until no inspections fail to meet the required accuracy and quality.

- 3.9 At the end of the project, an external hard drive shall be submitted to the City containing all information pertaining to the project. All CCTV pipe inspection data and defect coding will be submitted within one database in the PACP certified format.

4.0 EXECUTION

4.1 Sewer Cleaning

Unless stated otherwise, all inspections and resulting records, reports, and videos must follow all procedures, processes, and recommendations outlined within CSA Plus 4012-10. Defect codes must align with NASSCO PACP defect codes.

4.1.1 Block debris at downstream manhole to prevent contamination of the downstream mains. Sludge, dirt, sand and other debris resulting from the cleaning operations shall be removed from the downstream manhole of the section being cleaned. Passing material from the section being cleaned to the downstream sewer section shall not be permitted.

4.1.2 The liquid portion of material removed at the manholes shall be decanted back into the sewer. The solid and semi-solid material removed at the manholes shall be disposed of at a designated site as approved by the City of Regina.

4.1.3 The maximum allowable water level within a pipe, during inspection, is 20%. The Contractor is required to bring down the water level where any part of any pipe exceeds 20%.

4.2 Traffic Control

4.2.1 Interference to the normal flow of traffic shall be kept to a minimum.

4.2.2 Traffic control equipment shall conform to the City of Regina Manual for Temporary Traffic Control.

4.3 Closed Circuit Television Inspection

Unless stated otherwise, all inspections and resulting records, reports, and videos must follow all procedures, processes, and recommendations outlined within CSA Plus 4012-10. Defect codes must align with NASSCO PACP defect codes.

4.3.1 The CCTV inspection shall provide a full record of the condition of the pipes, manholes, and appurtenances along the designated section of sewer. This shall include all installation and material defects. Inspections shall ascertain both operational and structural pipe condition.

4.3.2 For new construction, completely wet the sewer with clean water to fill any

sags prior to inspection.

- 4.3.3 The Contractor shall not attempt a CCTV inspection if water levels in the pipe obstruct the camera's view unless instructed by the City.
- 4.3.4 Travelling speed, lighting, and camera positioning shall all follow CSA Plus 4012-10.
- 4.3.5 During the inspection, the camera operator shall pan the camera to focus on observable deficiencies in the pipe that may be located off-center to the direction of camera travel. This shall include, but not be limited to, all services, joints to the top, left or right, cracks and fractures or surface deterioration of the pipe walls. Pan and tilt into each service connection.
- 4.3.6 Acceptance of CCTV inspection is based on the City's review of all submitted material.
- 4.3.7 Upon completion, the Contractor shall provide inspection reports and digital media as detailed in Section 3.0 above.
- 4.3.8 The City, or a City approved contractor, can excavate a pipe in order to free lodged camera equipment at the expense of the Contractor.
- 4.3.9 The Contractor must employ a flush and follow method of inspection where the inspection camera follows a short distance behind a water jet. The water jet will lower standing water in front of the camera and allow for more thorough inspections.