

THE CITY OF WATERLOO

SPECIFICATION FOR THE

**INVESTIGATION OF SANITARY SEWER LATERALS USING
CLOSED CIRCUIT TELEVISION CAMERA (CCTV)**

2016

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INVESTIGATION OF SANITARY SEWER LATERALS USING CLOSED CIRCUIT TELEVISION CAMERA (CCTV)

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1.0 Scope of work

1.1 General

This specification covers the City of Waterloo requirement for inspecting new and existing sanitary sewer laterals using Closed Circuit Television (CCTV) camera system.

This specification shall be read in conjunction with any applicable contract documents, City of Waterloo Standard Specifications For Trenchless Sewer Service Replacement (Pipe Burst), OPS General conditions of contract, and OPSS 463 Construction Specification for pipe line and conduit installation by pipe bursting.

The contractor shall be responsible for all equipment and labour necessary to perform the inspections of the sewer laterals described under the attached quotation and other requirements that may be authorized from time to time. The contractor is also responsible for contacting the homeowners and scheduling all appointments when necessary.

The equipment operator shall be fully trained in all aspects of sewer lateral inspection and capable of accurate observations and reporting of all conditions found.

The City will provide a listing and map of the sewer laterals to be cleaned (if necessary) and video inspected. The listing will contain the homeowner's address, name and telephone number where available, to assist the contractor in the scheduling of appointments.

Changes, errors or mistakes made by the contractor or his agents, workers or employees, either through carelessness or otherwise, must be rectified by the contractor, at his own expense. In all cases of misunderstanding and disputes, verbal arrangements will not be considered. If any changes are made to the contract, written documentation containing the signatures of both parties must be produced.

The inspection can take place from the clean out located in the basement towards the main or from the main using a main launch camera towards the house. In either case the starting point and direction shall be clearly noted on the video inspection and report.

1.2 Objectives:

To obtain a complete and accurate inventory, condition analysis and location of sanitary lateral connections. This inventory will be used by City Staff to:

- Confirm locations of bituminous fibre pipe laterals (black pipe).
- Prepare plans for maintenance and rehabilitation.
- Evaluate methods of rehabilitation.

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- Supply data to contractors to obtain rehabilitation proposals.
- **1.3 Contractor Responsibilities**
- Making appointments with residents for access to homes for video inspections or reporting on accessibility of basement clean outs.
- **Electronic Copy of all appointments shall be provided to the Contract Administrator every month.** This will be reviewed at a monthly meeting. Main launched camera shall be used for the houses where no appointment could be made for an inspection. All scheduled laterals shall be investigated, unless specific situation arises such as obstruction in pipe.
- **If a main launch camera is to be used, notification to the residents is still required and if the lateral is found to be black pipe then an inspection of the clean out is required.**
- If a main launch camera is to be used, video inspection should not continue beyond the foundation wall of the building.
- Clean or ream any minor obstructions from the lateral in order to obtain a complete video inspection of the laterals. Video inspect and record conditions of the laterals. It is not unusual for laterals to have localized restrictions down to 2”.

2.0 References

This specification refers to the following standards, specifications or publications
Water Research Center (WRc) Publication

3.0 Definitions

Following definitions apply for this specification:

CCTV: Closed Circuit Television.

Lateral: Sanitary Service from the sewer main to the building

4.0 Submission and Design Requirements

The following documentation shall be submitted to the Contract Administrator two weeks prior to the start of CCTV inspection operations.

- Submit a sample inspection report and digital MPEG video recordings at least two weeks prior to beginning the inspection work, for the City staff’s review.
- General explanation of the process that will be used to complete the work, (i.e. booking appointments, times for inspections, expected number of inspections per day, etc.
- A copy of the CCTV operator’s current Certification. A copy of said certificate is required for each operator working on the contract.

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- Copies of detail specifications of main launch lateral camera, push lateral camera, video recording equipment, reaming and robotic cutting equipment to be using in undertaking the contract.

5.0 Scheduling of Work

The City will arrange the sequence of work with priorities being inspection of proposed construction projects. The City reserves the right to make additions and deletions as necessary. No payment shall be made for movement from location to location or travel time to the City.

The contractor shall, on the working day prior to the work being done, advise the City of the locations where the unit will be working the following day including starting and finishing times. The City's representative shall be notified immediately if the unit will not be working the following day. In the case of lost time due to inclement weather, excessive fogging within the sewers, breakdown, and late arrival etc., the Contractor will be paid for actual completed inspections.

Every month, the contractor shall submit a work order that is to be signed by the Contract Administrator which informs of the locations video inspected, number of hours, any problems encountered, etc. for the previous month. This will be done at a monthly meeting. This meeting will also confirm the upcoming month's work schedule.

5.1 Contact Phone Number

The contractor must supply the names, contact phone numbers and qualifications of the operators who will be working in the City before work will begin.

6.0 Equipment and Material

6.1 Survey Equipment

The surveying equipment shall be capable of surveying pipelines ranging from:

- 2.5 m to 6.0 m in depth
- 25 m to 40 m in length
- 100 mm to 150 mm in diameter
- Contain at least one horizontal and or vertical bend ranging from approximately 22.5 to 45 degrees
- Consist of Transite, Bituminous Fibre, Vitrified Clay, PVC or a combination of these materials.

Work shall not commence in a work shift until the Contract Administrator is satisfied that all items in the *section 4.0 Submission and Design Requirements* of the survey equipment have been provided and are in full working order.

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6.2 Video equipment quality

The electronic systems, television camera and monitor shall be of such quality as to enable the following to be achieved.

6.3 Camera and Video Recording Equipment

The inspection shall be carried out using specially designed television cameras and video recording equipment. Main launch camera shall be used as an option for the inspection of laterals that have no access from the clean out of the house due to any reason.

A continuous record on new videotape of the internal condition of the lateral shall be converted into a digital video file and provided on DVD. All sections must be recorded either using slow play on high quality VHS videotape or directly on to a hard drive of the computer then record on to a DVD.

In addition, an item has been included under this contract for the supply of DVD- ROM recordings of the inspections. This work shall be undertaken at the direction of the contract administrator. Camera speed shall not exceed 6 meters per minute. This speed is to be used when the pipe is relatively free from defects, when defects are found; the camera should pause briefly so that the defect can be noted on the screen.

7.0 Cleaning Precautions and Recovery of Equipment

The contractor shall take every reasonable precaution to ensure that his camera does not become stuck or jammed in the sewer. Should this occur, the City will make no payment for lost time. The contractor shall be responsible for all costs associated for recovering the equipment. If any time, the sewer cleaning equipment is stuck in the a lateral due to a structural defect, the contractor may be required to leave it until the time the lateral can be excavated by the City and the equipment is retrieved. There will be no extra payment for this.

8.0 CCTV Inspection

The work shall include a CCTV inspection of the sanitary lateral, and preparation of all video, digital and written reports. The CCTV operator shall be certified by NAAPI. Either fixed mini lateral camera system or main launch lateral camera shall be used for the video inspection.

The following minimum information shall be reported on the Sanitary Lateral Information sheet (schedule "A") and on the written report:

- Pipe:
- Depth
- Material
- Length
- Bends including:

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- Location
 - Degree
 - Orientation (vertical or horizontal)
 - Defects (using WRc defect codes)
 - Types
 - Location
 - Severity
 - Amount
 - Clean out
 - Existence
 - Location
 - Depth
 - Size
 - Accessibility
 - Location of Lateral
 - Municipal address
 - Plan of Property (see Appendix 'A') showing
 - House location
 - Road location
 - Lateral location
 - Water service
 - Significant landscape features (i.e. sidewalks, retaining walls, trees, etc.)
- **Colour photos of the front of the lot from the road with traffic cones showing the delineation of the lateral between the main and the front of the house. Colour photo of the clean out with the house civic number on it.**

9.0 Reports and Video Tapes

Reports shall be submitted to the Contract Administrator in the following formats, within 30 working days of the completion of fieldwork, with the noted number of copies.

The Contractor shall submit to the Contract Administrator, one copy of presentation binder for each street shall contain a cover page, table of contents and Sanitary Lateral information sheet (Appendix 'A'), inspection report for each lateral inspection and two DVDs (original and a duplicate).

A DVD-ROM Shall contain:

- Separate MPEG video files electronic copies of written reports for each lateral.
- Ensure each digital video file (MPEG) contains a file name with a maximum of 6 Characters in accordance with the following:
This inventory assignment number is described further in Appendix "C"

9.1 Video and Data Format

Record the Analog Format Video in conformance with the following requirements.

Inspections will be in colour on VHS format videotapes at standard play speed (SP mode). Use

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high grade, new unused videotapes.

Digital Format Video will be in conformance with the following requirements.

Capture in colour from the live video source in parallel with the VHS tape recording to the following requirements.

- HQ-VCD MPEG1 Requirements.
- Picture Size: NTSC 352 x 240 @ 29.97 frames per second.
- Data/Bit Rate: MPEG-1 @ 2.4 M-bits/sec.
- Use video capture equipment capable of capture with no frame loss to obtain digital video from first generation recordings. Digital video recordings can be saved to a hard drive and transferred to DVD-ROM media for submission.
- Each inspection will be contained within one complete single digital file that will be produced in one of the following ways.
- Use a computer system and video capture card to capture the original recording continuously, regardless of the progress of the inspection. Edit the original raw digital file to remove pauses where inspection progress is not continuous before submission.
- Use a computer system and video capture card intermittently to capture the original recording.
- Edit the original raw digital file to form one continuous file for submission.
- Use specialized video recording equipment capable of pausing and resuming live recording to capture original recording. Produce a single file for submission.
- Use non-linear video editing software to edit digital videos. Do not recompress edited digital files.
- Submit digital files of the original video inspections on DVD-ROM in slim-line clear “jewel cases” capable of displaying the information in the ‘Report Label Template’ and the ‘Typical Video Summary Data’ tables.
- At the start of each survey use a video overlay system to clearly display, on the monitor and video recording for 30 seconds (Appendix ‘B’)

10.0 Measurement for of Payment

Payment for the lateral video inspection will be based on the success of the inspection. A rate will be paid on the percentage of the lateral that was video taped. (i.e. if a lateral is 50 m in length and 25 m is successfully inspected, then payment will be for 50% of a complete inspection). Sewer blockage clearing will be paid on an hourly basis.

11.0 Method of Payment

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Payment at the contract price of the appropriate tender item for the installation of sanitary sewer lateral shall include full compensation for all labor, equipment and material to do the work of CCTV inspection.

Payment will be based upon the completion of the Sanitary Lateral Information Sheet, a price per each Lateral Video Inspection and an hourly price for Clearing Sewer Lateral Blockages. Payment will be authorized only after the City has received, reviewed and accepted all of the following:

11.1 Payment for complete inspections shall include the following items:

- A completed Sanitary Lateral Information Sheet
- A video inspection on DVD-ROM and Report
- A detailed invoice summarizing hours of cleaning (authorization required for each occurrence)
- 100 percent of the lateral length shall be inspected either: from the house clean out to the sewer main or from the sewer main to the house clean out or part of the lateral from the main to a specific point and rest of the lateral from the clean out of the house to the point where inspection stopped from the main.

11.2 Payment for incomplete inspections shall include the following items:

- At least three attempts should be made to make an appointment with the home owner
- This information shall be highlighted in the appointment schedule, which shall be available for each bi-weekly meeting as stated in *Section 5.0 Schedule of Work* within the contract specification.
- If it is a partial inspection, it should be clearly indicated both on the video and on written report as to why the inspection was abandoned. Valid reasons for abandonment are listed below:
 - A protruding lateral that the camera couldn't pass through.
 - Heavy encrustation at the lateral which prevented through passage of the camera.
 - A defective sewer main (collapse, broken pipe, off set joint) which prevented further passage along the main to the lateral
 - Obstruction in the lateral such as hard object, collapse, broken pipe, open joint or sharp bends preventing passage along the lateral.
- If any of above stated conditions occurs, based on the contract price for *Camera Equipment Setting up time*, the City will pay a flat rate for the incomplete inspections. It is our belief that approximately 10% of the laterals being inspected will require blockage clearing to allow for the inspection camera to pass through the entire length of lateral. The contractor requires authorization from the Contract Administrator before any cleaning occurs.

12.0 Appendices