

SECTION 614

TELEVISION INSPECTION SPECIFICATIONS

A. TELEVISION EQUIPMENT

1. All designated sewer sections shall be visually inspected by means of closed-circuit color television.
2. Television equipment shall include television camera, television monitor, cables, power source, lights, and other equipment. The television camera shall be specifically designed and constructed for operation in connection with sewer inspection. **The Camera shall be capable of a radial view (panning, tilting and rotating to be able to view the entire circumference of the pipe) for inspection of the top, bottom, and sides of pipe and for looking up lateral connections.** The view seen by the televising camera shall be transmitted to a monitor of not less than 17 inches. The camera, television monitor, and other components of the video system shall be capable of producing a picture quality satisfactory to the Engineer; and if unsatisfactory, the equipment shall be removed and no payment will be made for an unsatisfactory inspection.
3. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 650-line resolution color video picture. The camera shall be mounted on skids suitably sized for each pipe diameter to be investigated or on a self-propelled transporter specifically sized for each pipe diameter to keep it in the center of the pipe.
4. The camera shall be operative in 100 percent humidity conditions and tested at 400 psi. Lighting for the camera shall minimize reflective glare. The lighting shall be supplied by a lamp on the camera, capable of being dimmed or brightened remotely from the control panel. Lighting and camera quality shall be suitable to provide a clear, in-focus picture of the entire inside periphery of the sewer pipe for all conditions encountered during the work. Focal distance shall be adjustable through a range of from 6 inches to infinity.
5. The location meter, for accurately recording the location of the television camera with respect to the reference manhole, shall be a direct reading, above ground, friction clamp device or other suitable equipment. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. The meter shall be capable of reducing readings for reverse movement of the camera and shall be capable of being manually re-zeroed for each new segment (MH-to-MH or MH-to-Inlet).
6. The importance of accurate distance measurements is emphasized. The remote reading footage counter shall be accurate to one percent over the length of the particular section being inspected. Accuracy of the measurement meter shall be

checked daily by use of a walking meter, roll-a-tape, or other suitable device. Footage measurements shall begin at the centerline of the upstream manhole and end at the centerline of the downstream manhole. Footage shall be shown on the video data view and recorded at all times.

B. SEWER MAINLINE TELEVISION INSPECTION

1. All sanitary sewer televising work shall be done in accordance with Section 7.1.2 in the Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Edition and the National Association of Sewer Service Companies (NASSCO) and inspection reporting shall be performed by a NASSCO Pipeline Assessment and Certification (PACP) certified user. Reports shall utilize NASSCO's PACP version 7.0 standards and identify defects by category. Each sanitary sewer lateral shall be assigned a NASSCO rating of 1-5.
2. The camera shall be moved through the line in a downstream direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition but in no case shall the television camera be pulled at a speed greater than 30 feet per minute. **The Camera shall look up all lateral connections.** Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation or the sewer conditions shall be used to move the camera through the sewer line.
3. If, during the inspection operation, the television camera will not pass through the entire manhole section, the Contractor shall reset up his equipment in an opposite manhole. The Contractor shall provide the additional cleaning, root cutting and mineral deposit removal so that the entire line can be televised. Any necessary cleaning to properly televise the manhole shall be performed in conformance with Section 613 of the Contract Documents.
4. In the event the section being televised has substantial flow entering the sewer between manholes, such that inspection of the sewer is impaired, the Contractor shall coordinate with the owner of the source of flow to have such flow temporarily stopped and/or reschedule television inspection of the particular section to a time when such flow is reduced to permit proceeding with the television inspection.
5. When sewer line depth of flow at the upstream manhole of the section being televised is above the maximum allowable for television inspection, the contractor shall reduce the flow to permit proceeding with the television inspection. In addition, when the sewer line is sagged or depressed, the contractor shall attempt to suction out the sewage by using a sewer jet in close proximity to the television camera.

6. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two manholes or the section being inspected to ensure that adequate communications exist between members of the crews.
7. Footage measurements shall begin at the sewer line point of penetration of the upstream manhole, unless specific permission is given to do otherwise. Footage, to the nearest tenth (0.1') of a foot, shall be shown on the video data view at all times.
8. The lens of the camera shall be cleaned at each MH and when directed by the Engineer. Sewers shall not be televised during rainfall or periods when excessive clearwater is present in the sewer.

C. SEWER LATERAL TELEVISIONING

1. All sanitary sewer lateral televising work shall be done in accordance with Section 7.1.2 in the Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Edition and the National Association of Sewer Service Companies (NASSCO) and inspection reporting shall be performed by a NASSCO Pipeline Assessment and Certification (PACP) and Lateral Assessment and Certification Program (LACP) certified user. Reports shall utilize NASSCO's PACP standards and identify defects by category. Each sanitary sewer lateral and main shall be assigned a NASSCO rating of 1-5.
2. The contractor shall televise at least 30 feet of each lateral, measured from the center of the mainline pipe. If the contractor cannot reach this distance, a note must be made of the reasoning.
3. All sewer lateral inspection reporting shall include all needed traffic control for the safety of the work crews and public, and any costs of contractor elected nighttime inspection.
4. Properties with more than one service shall have the laterals first inspected to see which lateral is in use. Documentation of capped or abandoned lateral shall be provided to the City.

D. DOCUMENTATION OF THE TELEVISION RESULTS

1. Television inspections must be documented through the use of an in-vehicle computer system. This system must be IBM compatible on an external hard drive or another approved storage medium. All defects and general information on the pipe being viewed along with an index for retrieving the information must be supplied to the City as part of the report.

2. Television inspection logs shall be typed or computer printed and shall be on a form acceptable to the City. Printed location reports shall clearly show the location of each source of infiltration discovered in relation to adjacent manholes. The contractor shall estimate and record the flow rate. In addition, other data of significance including the location of building and house service connections, joints, unusual conditions, roots, storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features shall be recorded. A voice recording on the videotapes shall make brief and informative comments on the sewer conditions. The Contractor shall also take photographs of all faults, points of interest and where directed by the Engineer. Copies of the photographs shall be furnished to the City.
3. The measurement of distance to defects is critical in confirming the location of areas to be excavated. All inspections shall start at the center of the manhole or inlet.
4. The contractor shall make color video recordings of the data on the television monitor. A copy of each recording on an external hard drive or another approved storage medium shall be provided to the City.
5. Recorded playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features may be supplied at the option of the contractor. Title to the tape will remain with the City. The Contractor shall have all necessary playback equipment readily accessible for review by the City during the project. Tape speed shall be noted on the recorded videotape.
6. The contractor shall provide a NASSCO-PACP Certified Access Database for all pipe segments evaluated as part of the contract for integration into the City's GIS computer system.
 - a. The database shall include information in a format that is compatible with City's GIS system.
 - i. Upstream Manhole – As shown on Plans
 - ii. Downstream Manhole – As shown on Plans
 - iii. Pipe Inspection ID: [Upstream Manhole]_[Downstream Manhole]
7. Recordings shall include the following information:
 - a. Data view (Visible on screen in an inconspicuous place):
 - i. Report number
 - ii. Date of TV inspection
 - iii. Either upstream and downstream manhole numbers, **formatted to the exact manhole number as shown on the plans**, or address of the lateral being televised

- iv. Current distance along reach (counter footage to the nearest tenth of a foot)
 - v. Printed labels on the recording container and recording with location information, date, format information, and other descriptive information.
 - b. Audio:
 - i. Date and time of TV inspection, operator's name and name of adjacent street.
 - ii. Verbal confirmation of upstream and downstream manhole numbers and TV direction in relation to direction of flow.
 - iii. Verbal descriptions of pipe size, type and pipe joint length.
 - iv. Verbal description and location of each service connection and pipe defect.
 - v. Type of weather during inspection and for the previous 24-hour period.
- 8. Television inspection logs shall include, but are not limited to, the following information:
 - a. Date, time, city, street, basin, sewer section, reference manhole number or reference address, name of operator, inspector, and weather conditions.
 - b. Pipe diameter, pipe material, section length, depth of pipe, length between joints, and corresponding videotape identification.
 - c. Location of each point of leakage.
 - d. Location of each service connection.
 - e. Location of any damaged sections, nature of damage, and location with respect to pipe axis.
 - f. Deflection in horizontal or vertical alignment of the pipe.
- 9. The Contractor shall provide one (1) professionally bound copy of the report to the City. A summary shall be included and shall include the television inspection logs as specified. A one-page summary sheet shall also be provided which states the sewer section, length, size, date completed, and totals.