

STANDARD SPECIFICATIONS
SECTION 02956
CLOSED CIRCUIT TELEVISION INSPECTION
OF SEWER MAINS, MANHOLES AND LATERALS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Section includes requirements to execute internal closed circuit television (CCTV) survey to inspect sewer mains, manholes and laterals.

1.2 SUBMITTALS

- A. Submit following Section 01330.
 - 1. Sample of television survey log, DVD/CD-ROM video, and equipment list for approval before commencement of work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General.
 - 1. Provide equipment to perform inspections of sewer mains, manholes and laterals from mainline to property line or cleanout located in streets, street rights-of-way, and off road easements.
 - a. Including but not limited to portable CCTV equipment, vehicles capable of transporting TV equipment and accessing remote easements, and adequate cleaning equipment.
 - 2. Have DVD and necessary playback equipment readily accessible for review by Engineer.
 - 3. Certify that backup equipment is available and can be delivered to site within 48 hours.
- B. Software Requirements.
 - 1. Follow National Association of Sewer Service Companies (NASSCO).
 - a. Sewer Mains: Follow Pipeline Assessment Certification Program (PACP)
 - b. Laterals: Follow Lateral Assessment Certification Program (LACP)
 - c. Manholes: Follow Manhole Assessment Certification Program (MACP)
 - 2. Populate access database provided by Commission.
 - 3. Video: Recorded in MPEG1/PPEG2 format.
- C. Sewer Main and Lateral CCTV.
 - 1. Color Video Camera:
 - a. Specifically designed and constructed for this application.

- b. Camera, Television Monitor, and Other Components: Capable of producing minimum 470H-line resolution color video picture.
- c. Able to inspect laterals as small as 3-inches up to 70 feet from sewer mainline.
- d. Pan and tilt type, capable of turning at right angles to pipe's axis over an entire vertical circle (minimum pan of 270 degrees and rotation of 360 degrees).
- e. Lateral Camera: Self leveling type.
- f. Lighting: Suitable to allow clear picture of entire inner pipe wall extending at least 10 feet in front, including black High Density Polyethylene (HDPE) pipe.
- g. Operative in 100 percent humidity conditions.
- h. Image: Capable of self righting itself.
- i. Include data view display feature capable of showing following information.
 - 1) Lateral addresses.
 - 2) City and state.
 - 3) Date and time.
 - 4) Project name.
 - 5) Contractor's name.
 - 6) Inside pipe diameter and type.
 - 7) Manhole identification (upstream manhole to downstream manhole).
 - 8) On-going footage counters accurate within 0.2 foot.
 - 9) Operator narration capability: Follow NASSCO standards.
 - a) Naming conventions for lateral pipes following WSSC protocol.
 - (1) Each asset assigned an ID.
 - (a) Lateral.
 - (b) Cleanout.
 - 10) Recording of single section of sewer onto 2 DVD/CD-ROMs will not be acceptable.
- j. Clearly label each DVD as approved by Engineer.
- k. Mounting:
 - 1) Launched from within mainline sewer: Mounted on tread tractor that moves through sewers and positions inspection camera launcher opposite lateral line connection.
 - 2) Launched from within cleanout: Able to travel to mainline sewer.
- l. Attachment: Push cable with fiberglass rod core.
- m. Able to laser profile inside diameter.

D. Manhole CCTV.

- 1. Color Video Camera:
 - a. Specifically designed and constructed for this application.
 - b. Capable of capturing both video and high resolution stills.
 - c. High-resolution, pan and tilt or rotating head (manually performed or motor operated) with wide viewing angle lens and either automatic or remote focus and iris control.

- d. Lighting: Suitable for use with digital color inspection cameras and pipe diameters identified in contract.
- e. Operative in 100 percent humidity conditions.

PART 3 EXECUTION

3.1 GENERAL

- A. Perform work in two phases as listed.
 - 1. Phase I
 - a. Perform internal CCTV inspection of mainline sewer, manholes and each associated sewer lateral following CCTV preconstruction survey requirements below.
 - b. Perform above ground survey following, Lateral External above ground Survey herein.
 - c. Submit inspection records and survey information to Commission promptly upon completion of work for evaluation.
 - d. Identify lateral sewer rehabilitation candidates and suggested repair or rehabilitation method and why suggestion is appropriate to Commission for evaluation.
 - e. If authorized by Engineer, perform other additional work necessary for completion of these tasks, such as point repair of existing lateral or installation of vacuum excavated cleanouts.
 - 2. Phase II
 - a. Perform repair, rehabilitation or replacement of defective or aging laterals, mainlines and manholes as indicated in task order. Following Standard Specifications and Contract Documents.

3.2 CCTV PRECONSTRUCTION SURVEY

- A. CCTV Procedure.
 - 1. Sewer Mainline.
 - a. Before repair work, light clean and inspect sewer line from manhole to manhole, preferably upstream to downstream, one section at a time. Light cleaning includes up to 3 passes with hydraulic jet cleaner.
 - 1) If light cleaning is ineffective in cleaning sewer, heavy cleaning method may be approved by Engineer.
 - a) Heavy cleaning uses non-hydraulic jet efforts such as porcupines, cutters, power rodding, clam buckets and other mechanical means.
 - 2) Remove sludge, dirt, sand, grease, root and other material from downstream manhole of sewer section being cleaned.
 - 3) Collect debris and remove from site.
 - a) Transportation and disposal of debris: Follow jurisdiction requirements and Engineers approval.
 - b. Maintain sewer main isolation by plugging or bypass pumping while camera is moving and recording.

- 1) Plugs: Secured to remain in place during inspection.
 - 2) Conduct operations to prevent backups and sewer overflows.
 - 3) Be responsible for cleanup, repair, fines, property damage costs and claims for any sewage backup, bypass spillage or sanitary sewer overflow.
 - a) Follow Section 02530 for reporting requirements.
2. Lateral: Follow mainline above, except as modified below.
 - a. Verify accessible cleanout exists adjacent to property line, prior to performing CCTV of lateral.
 - 1) Notify engineer if accessible cleanout does not exist. If approved by Engineer, construct vacuum excavated cleanout following Section 02530 and 02955.
 - b. Inspect entire lateral simultaneous with CCTV inspection. Clean and flush lateral with clean water.
 - c. Isolate section inspected.
 - 1) Method may include turning off property water, or bypassing flow.
 - d. Prevent backflow into laterals.
 - e. Identify inspection by building address and mainline.
 - 1) If lateral services two addresses, identify both addresses.
 - 2) Provide distance and location tie to permanent existing feature.
 - f. External above ground inspection survey as specified herein.
 - 1) Provide narrative of above ground features within 10 feet of lateral centerline.
 3. Manhole.
 - a. Document and perform above ground survey.
 - 1) Record along alignment of interceptor and surface cover.
 - 2) Obtain still photos of exterior of manhole and surrounding area.
 - b. Interior Inspection:
 - 1) Start camera at manhole rim in line with largest diameter outgoing pipe.
 - 2) Rotate camera clockwise until 360 degree panorama is complete.
 - a) Provide still photos of defects noted, following MACP.
 - 3) Lower camera 2 to 3 vertical feet and repeat procedure outlined above.
 - 4) Repeat previous step until bench invert is reached.

B. Camera.

1. Placement.
 - a. Manhole:
 - 1) Place at center of manhole and commence video before entering pipe.
 - 2) Start footage counter at manhole wall.
 - b. Mainline.
 - 1) Mount on transport platform that will keep it centered along longitudinal axis of sewer mainline and above water.
 - 2) Laterals from mainline.
 - a) Place into lateral and commence video recording before entering lateral.
 - b) Start footage counter at connection.

- 3) Laterals from cleanout.
 - a) Place camera into sweep and commence video recording before entering lateral or before lowering through cleanout stack.
 - b) Start footage counter at sweep.
2. Operation.
 - a. Record section of sewer in its entirety with no breaks or interruptions.
 - b. Show inside of manhole walls, manhole channel, and pipe connection to wall at both upstream and downstream manhole and lateral connections.
 - c. Move through line at speed no greater than 30 feet per minute stopping for minimum 10 seconds to record lateral connections, mainline connections, defects, and features and points of interest.
 - d. Maintain technical quality, sharp focus, and distortion free picture.
 - e. Pan, tilt, and rotate as necessary to best view and evaluate lateral connections, defects, features, and points of interest.
 - f. Use power winches, powered rewinds, tractors, or other devices that do not obstruct camera view or interfere with proper documentation of sewer conditions to move camera through sewer.
 - 1) Whenever non-remote powered and controlled winches are used set up suitable means of communication between manholes.
 - g. Use hydraulic jet nozzle if necessary to remove standing water from line.
 - h. Eliminate steam in line for duration of inspection.
 - 1) Utilize blower as needed to defog sewer line.
 - i. Measurement for location of defects and service laterals:
 - 1) Engineer-approved footage counter or metering device taken at ground level.
 - 2) Measurement meters: Accurate to 0.2 foot over length of section being televised.
 - 3) Use measuring target in front of television as exact measurement reference point.
3. Movement.
 - a. Mainline.
 - 1) Stop camera at lateral connections and inspect with pan and tilt camera.
 - a) Active lateral connections where flow is discharging.
 - (1) Identify building address and confirm that laterals are active by obtaining flush, with or without dye, of property owner's commode or by using outside cleanout, if available.
 - b) No flows being discharged from building: Considered as infiltration/inflow.
 - 2) Laterals.
 - a) Move camera through lateral at uniform rate from mainline to property line or cleanout.
 - b) Stop at each suspected defect to allow adequate evaluation.

C. Defects.

1. If roots, sludge, or sediment material impedes inspection withdraw camera and re-clean mainline by hydraulic jet.

- a. Upon completion of re-cleaning operation resume internal inspection.
- b. Furnish media confirmation for heavy cleaning to Engineer.
- 2. If protruding tap impedes inspection trim protruding tap to 1/2 inch.
- 3. If obstructions are not passable and cannot be removed by sewer cleaning or reaming, withdraw CCTV equipment and perform inspection from opposite end.
 - a. Cost involved in extracting camera stuck in sewer line: At no additional cost to the Commission.
 - b. When additional obstructions are encountered after re-deployment of equipment, and no means are available for passing obstructions, remand to Engineer for resolution.

D. Field Documentation.

- 1. Submit original records, logs, and electronic inspection data to Engineer within 10 working days.
 - a. Provide the following at minimum.
 - 1) Contract Number and Project Name.
 - 2) Basin name
 - 3) Contractor.
 - 4) Operator name.
 - 5) Date and time (begin to end inspections).
 - 6) Weather conditions.
 - 7) Q.A. Reviewer name.
 - 8) DVD number and index.
 - 10) General physical conditions.
 - 11) Footage locations, clock position, and descriptions of defects and estimated leakage rates for visible point sources of infiltration/inflow.
 - b. Mainline. In addition to information listed above, include;
 - 1) Inside pipe diameter and type.
 - 2) Manhole identification (upstream and downstream manhole)
 - 3) Follow PACP.
 - c. Manholes. In addition to information listed above, include;
 - 1) Manhole records and digital photos: Labeled with manhole number identification
 - 2) Follow MACP
 - d. Laterals. In addition to information listed above, include;
 - 1) Address of each lateral including city and state.
 - 2) Owner.
 - 3) Length of lateral segment.
 - 4) Direction of CCTV (from property line or form mainline connection).
 - 5) Lateral size.
 - 6) Lateral material.
- 2. DVD/CD-ROM.
 - a. Once recorded, DVD/CD ROM becomes property of the Commission.
 - b. Use observation terminology during audio narration consistent with PACP, MACP and LACP.

- 1) Naming convention for lateral connections following WSSC protocol: Referenced to access from mainline (AML) or downstream manhole (AMH). Do not use naming convention for access from cleanout (ACO) or other access point.
- c. Clearly label each DVD/CD ROM as approved by Engineer.
- d. Recording of single section of sewer on 2 DVD/CD ROMS: Not acceptable.
- e. DVDs displaying poor video quality (Includes but not limited to; grease or debris on lens, camera under water, image too dark, washed out, distorted or out of focus, lines improperly cleaned or poor/no audio).
 - 1) Re-televiser line and resubmit at no cost to Commission.
 - 2) Rejection by Engineer of original recording for failure to comply with requirements herein will incur charge based on current hourly fee for additional review time.

3.3 POST-CONSTRUCTION SURVEY

- A. Follow procedures as specified for pre-construction survey above, except as specified below.
 1. Sewer Mains and Laterals.
 - a. Operation of Camera.
 - 1) Stop camera (minimum 10 seconds) at beginning and end of repairs and inspect repaired section.
 2. Manhole CCTV.
 - a. Manhole inspection: Follow MACP standards.
 - b. Begin with above ground exterior survey documentation.
 - 1) Record along alignment of interceptor and surface cover.
 - 2) Obtain still photos of exterior of manhole and surrounding area.
 - c. Interior CCTV inspection.
 - 1) Start camera at manhole rim in line with largest diameter outgoing pipe. Rotate camera clockwise until 360 degree panorama is complete.
 - a) Provide still photos of any defects noted.
 - 2) Lower camera 2 to 3 vertical feet and repeat procedure
 - 3) Repeat until bench invert is reached.
 3. Associated Pipe Segments CCTV.
 - a. After completion of manhole CCTV inspection, reset camera for pipe segment inspection.
 - b. Begin with largest diameter outgoing pipe segment.
 - c. Center camera on pipe as reasonably possible while keeping it above flow.
 - d. Adjust focus and lighting to observe most distant point in pipe and bring focus and zoom to nearest point of interest.
 - e. Capture and record individually special features noted.
 - f. Record defects noted using standard PACP nomenclature.
 - g. Record minimum of 60 seconds per pipe segment.
 - h. After inspecting outgoing pipe segment, rotate camera clockwise to locate next pipe segment and repeat inspection process.

- i. Repeat clockwise rotation until all pipe segments in manhole are documented utilizing the same procedure.
- B. Field Documentation.
 1. Follow procedures specified for preconstruction survey above, except lateral also include but not limited to following items;
 - a. Confirm address of each lateral.
 - b. Direction of CCTV.
 - 1) From top of cleanout to mainline connection
 - 2) From mainline to cleanout.

3.4 LATERAL EXTERNAL ABOVE GROUND SURVEY

- A. Provide narrative and/or sketches (as required) documenting features within 1:1 slope. Beginning at centerline of mainline sewer or lateral cleanout and extending up to grade that may affect the work should an open cut trench replacement be ordered. Locate features located along lateral from mainline sewer and offsets left or right.
 1. Include distances, note curbs, sidewalks, fences, landscape features, trees and drip lines and other features that would need to be considered for restoration during repairs.

3.5 PUBLIC NOTIFICATION

- A. See Section 02950.

PART 4 MEASUREMENT AND PAYMENT

4.1 HEAVY MAINLINE CLEANING

- A. Measurement: By linear foot along center line of mainline sewer cleaned.
- B. Payment: At unit price listed in Bid Schedule.
 1. Payment includes non-hydraulic jet efforts such as porcupines, cutters, power rodding, clam buckets, and other mechanical means, traffic control, and re-cleaning with hydraulic jet, labor, materials, and equipment necessary to clean mainline sufficiently to allow video reviewers a clear picture of pipe conditions.

4.2 MAINLINE CCTV INSPECTION WITH NO REHABILITATION

- A. Measurement: By linear foot of mainline sewer inspected.
- B. Payment: At contingent unit price listed in Bid Schedule.
 1. Payment: includes labor, mobilization, CCTV equipment, recording media, bypass pumping, traffic control, and light cleaning of mainline sewer.

4.3 LATERAL CCTV INSPECTION WITH NO REHABILITATION

- A. Measurement: By each location of lateral sewer inspected.
- B. Payment: At contingent unit price listed in Bid Schedule.
 - 1. Payment includes labor, mobilization, CCTV equipment, recording media, bypass pumping, traffic control and light cleaning of mainline sewer.

4.4 MANHOLE CCTV INSPECTION WITH NO REHABILITATION

- A. Measurement: By each manhole inspected.
- B. Payment: At unit price listed in Bid Schedule.
 - 1. Payment includes labor mobilization and access, manhole inspection equipment, recording media and traffic control.

****WSSC****