

SPECIFICATION FOR TELEVISION INSPECTION, LARGE DIAMETER SEWERS
(As provided by Specialty Sewer Services, Inc.)

1 Scope of Work:

- (1.1) The work consists of furnishing all labor, materials, accessories, equipment, tools, transportation, services and technical competence for performing all operations required to professionally execute the internal inspection of sewers in strict accordance with this specification and applicable drawings, and subject to the terms and conditions of the contract.
- (1.2) Information concerning depths of flow, manhole depths, air quality in the sewers, accessibility of manholes, traffic conditions, and other safety considerations are to be the sole responsibility of the Contractor to obtain and to incorporate the necessary provisions into the overall contract price to complete the specified work under the conditions existing in the sewers to be inspected.

2 Procedures and Equipment:

- (2.1) Four basic methods of internal pipe inspection shall be made available by the Contractor for this project.
 - A. Conventional color inspection cameras specifically designed for use in sewer line inspection work, mounted on conventional camera skids.
 - B. Conventional color inspection cameras specifically designed for use in sewer line inspection work, mounted on floating skids or rafts.
 - C. Special industrial grade color inspection cameras, contained in waterproof housings, and mounted on floating skids or rafts.
 - D. Special industrial grade color inspection cameras, either hand held or contained in waterproof housings, and carried manually through the sewer during inspection work.
 - E. NASSCO recommends that all CCTV Inspection be performed by CCTV personnel who are trained and certified in the use of NASSCO's Pipeline Assessment and Certification Program(PACP)©.
- (2.2) The Contractor may be required to submit sample video recordings from recently completed projects demonstrating the picture quality obtained with each available inspection system for pipe diameters ranging from 27 to 108 inches, The intent is to insure that the best possible picture quality is made available to the Owner/Client.
- (2.3) All cameras used shall be color units specifically designed or modified for use in large-diameter sewer inspection work. The cameras shall be operable in 100% humidity conditions. The camera lens shall have not less than a 65-degree viewing angle and shall have either automatic or remote focus and iris controls. Camera lighting shall be sufficient for use with color inspection cameras, and for diameters larger than 48 inches, a minimum of 1,000,000 candlepower lighting in the 3200 degree Kelvin range

shall be made available. In all cases, the complete video system (camera, lens, lighting, cables, monitors and recorders) shall be capable of providing a picture quality acceptable to the Owner, and if unsatisfactory, equipment shall be removed and no payment will be made for unsatisfactory inspections.

- (2.4) Manual inspections will be required in lines where conditions will allow the Contractor's inspection crew to safely walk through the sewer. Specific reasons may be given as to why manual inspections are impractical or unsafe, if it is the intent of the inspection Contractor to use remote inspection methods for that group of lines. No remote inspection work may proceed until this submittal has been reviewed and approved by the Owner.
- (2.5) Manual pipe inspections (walk-through inspections) shall be conducted in such a manner as to transmit the video signal to an above-ground viewing room to permit the Owner's Representative to watch the inspection work live on a color monitor in the viewing facility. In addition, direct voice communication between the Owner's Representative, the in-pipe inspection personnel, and the recording technician in the above-ground unit shall be maintained at all times during the manual inspection work. Video recording equipment shall also be located above ground in the inspection truck and accurate, continuous footage readings shall be superimposed on the video recording of permanent record. Camcorders shall not be permitted for use as the sole means of obtaining video records.

During manual inspections, the video camera shall be used to look up sidelines and laterals, whenever practical, which are connected to the main line being inspected. Conditions noted in these sidelines and laterals shall be noted on the inspection logs and videotapes for the project.

During manual inspections, 35 mm color photographs shall be obtained as instructed by the Owner's Representative or as deemed necessary by the in-pipe technicians to document line conditions should the inspector not request specific photos.

Safety of the in-pipe inspection crew (minimum of two men in the pipe is required) is of prime concern. A minimum of two 6800 cfm air movers shall be available, if needed. In addition, both exhaust and blower type air movers will be available to provide push-pull ventilation for the sewer line being inspected by manual methods. Each of the technicians in the pipe shall also have safety equipment and lifelines as deemed necessary by the Owner's Representative.

- (2.6) Remote pipe inspections, using either electric or manually operated winches to pull the inspection camera through the sewer line, shall be permitted in cases where conditions are agreed to be unsafe or impractical for manual inspections and where acceptable picture quality can be obtained by the Contractor.

The camera shall be pulled through the sewer line in either direction at a speed not greater than 30 feet per minute, stopping as necessary to permit proper documentation of the sewer's condition. If, during the inspection operations the inspection camera will not pass through the entire manhole section, the Contractor shall reset his equipment so that the inspection can begin at the opposite manhole. If again, the camera fails to pass through the entire manhole section, the inspection shall be considered complete and no additional inspection work will be required.

In instances where manual or remote power winches are used to pull the camera through the sewer (i.e., where the recording technician does not directly control the winch), constant two-way communication shall be set up between the two manholes of the line being inspected to permit the recording technician to communicate clearly with the crew member controlling the camera's movement.

As with manual inspections, accurate and continuous footage readings shall be superimposed on the video recording for each line inspected by remote inspection methods. Also shown shall be the date of inspection and a three-digit manhole number designation for each manhole on the line section inspected.

- (2.7) Lines scheduled for inspection shall be inspected in their existing condition. The Contractor shall be responsible for having the necessary camera skids, floats, and rafts available to allow for inspection of these lines in a manner acceptable to the Owner under live flow conditions.

The following general criteria shall be followed:

- A. No inspections shall be performed where flow depths exceed 50% of pipe diameter without prior approval of the owner.
- B. The maximum flow depth for remote inspection work is 33% of the pipe diameter. The Contractor may be required to perform inspections during off-peak hours (night inspections) if specifically requested by the Owner to achieve this maximum flow standard.
- C. No maximum flow depth has been established for manual (walk-through) inspections since depths in excess of one-third pipe will probably make such inspection methods unsafe.
- D. Lines 60 inches in diameter and larger, and having flow depths of less than 20% of the pipe diameter, shall be manually inspected unless the Contractor provides the owner with reasons for deeming manual inspections to be impractical or unsafe.

The Contractor shall submit a listing of actual measured flow depths and times of measurement at a sufficient number of locations to indicate the flow depths that could be expected during inspection work. A minimum of one flow depth measurement shall be provided for each line section at no additional cost to the Owners. Additional off-peak flow measurements (i.e., night flow measurements) may be requested by the Owner at various locations also at no additional cost to the Owner.

- (2.8) A prestart-up meeting shall be scheduled with the Owner, the Contractor, and the Owner's Representative prior to beginning any internal pipe inspection work to review the Contractor's proposed inspection methods for each of the line section groupings described in 1.1. At that time, the Contractor shall have available the necessary flow depth data described in 2.7 as well as the overall listing of proposed inspection methods in each area.

- (2.9) The stated time for contract completion shall include the time required for obtaining the required flow depth measurements, the time for the prestart-up meeting, and any delays caused by the failure of the Contractor to provide the Owner with a acceptable picture quality on the video recordings. No time extension shall be permitted to allow the Contractor to make major equipment modifications once the Notice to Proceed has been issued. In addition, the Contractor shall execute the field work in a continuous manner and shall not leave the project for more than four continuous days without prior written approval of the Owner. Delays due to extended rain shall be permitted and time extensions shall be granted in writing at the written request of the Contractor.

3 Documentation and Reports:

- (3.1) Videotape recordings shall include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected (i.e., location, depth, diameter, pipe type), as well as describing connections, defects and unusual conditions observed during the inspection. All videotapes shall be of the 2-hour, VHS format and each shall be professionally labeled showing the Owner' name, the lines recorded on the tape, and the name of the Contractor.
- (3.2) Printed inspection reports shall be prepared by the Contractor for each sewer line inspected during the actual field inspection activities. These field logs shall then be reviewed by the Contractor's technical staff, along with reviewing the associated video record, as a means of insuring that no defects or entries are omitted or incorrect, and as a means of gaining a second opinion as to the condition of each sewer line. Edited field logs shall then be reprinted or typed for use in the final project reports. Detailed, one-page summaries shall also be prepared for each line section inspected, during the data review, presenting the engineer's synopsis of the general line condition and the relative severity of observed defects. These summaries shall also be included in all field report copies immediately before each associated inspected report to further assist the Owner in understanding and using the results of the inspection project. Direct submittal of copies of the field technician's field logs, without this secondary review and summary pages, shall not be acceptable.
- (3.3) The 35 mm photographs taken during manual, walk-through inspections shall be properly mounted and labeled on 8.5 x 11 inch paper for inclusion in the final project reports. One copy of the final reports shall contain the original 35 mm photos, on fully laminated pages, and the remaining requested copies shall contain copies of these photo pages, The photo pages shall be presented immediately following the inspection report for the line section in which they were taken.
- (3.4) Photographs taken from the video monitor for remote TV inspections shall also be presented in the same manner as described in 3.3. The Owner desires photos of all significant defects observed during remote inspection work; however, it is understood that it may not be possible to obtain clear still photos from the monitor for inspections in large-diameter lines where manual inspections are not performed.
- (3.5) Original videotapes for the project shall be forwarded to the Owner with final report submittals and shall become the property of the Owner. Additional copies of the videotapes, if requested, shall be made by the Contractor on professional tape duplication equipment.

- (3.6) Four complete copies of the final project reports shall be submitted to the Owner within forty-five days of completion of all field activities and within the stated time of completion for this project, One of the four copies shall contain the original photos as required under 3.3 and 3.4.
- (3.7) An overall summary narrative shall be provided in each Owner's report describing the overall conditions found in each associated line section grouping and detailed summary tables shall also be compiled showing those lines where major and significant defects were located to assist the Owner in subsequent project reviews.

4 Measurements for Payments:

- (4.1) Project mobilization/demobilization shall be paid at the lump sum price bid for this item. Seventy percent (70%) shall be paid on the first pay request, with the remaining thirty percent (30%) being paid once all field activities have been successfully completed and approved by the Owners. Project mobilization/demobilization shall not exceed five percent (5%) of the total bid price for this project.
- (4.2) Internal pipe inspections and video recordings of the sewer lines shall be paid for at the unit price bid per linear foot of each size pipe. Payment shall be made only for the actual feet of pipe inspected as measured from the center of the manholes.
- (4.3) Reverse setups (i.e., resetting the inspection equipment to begin inspections from the opposite manhole) shall be paid at the unit price bid per reverse setup, for the actual number of reverse setups recruited and approved by the Owner.
- (4.4) The original set of videotapes and all required photographs shall be incidental to the bid unit costs for the actual inspection work. Extra copies of the videotapes shall be paid at the unit cost bid for duplicate videotapes for the actual number of duplicate tapes requested by the Owner.
- (4.5) Final project reports shall be paid at the lump-sum price bid for this item at the time the final reports are received and accepted by the Owner. This bid item shall be no less than five percent (5%) of the total bid price for this project.