

**432 INSPECTION OF EXISTING PIPES AND STORM SEWERS.
(REV 9-03-19) (1-21)**

The following new Section is added after Section 431:

**SECTION 432
INSPECTION OF EXISTING PIPES AND STORM SEWERS**

432-1 Description:

Inspect pipes and storm sewers as shown in the Contract Documents. Provide video and a written report to list all deficiencies of the storm drain pipes, manholes and inlets, along with a detailed map of the storm water system inspected and videoed.

432-2 Video Equipment and Requirements.

432-2.1 Inspection and Video: Comply with OSHA Confined Space Standard, 29 CFR Part 1910.146. Manual inspections may be required in order to determine the extent of damage. Pipe walls in areas of concern should be sounded to identify any structural degradation.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe and rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition.

Provide a high quality color video with a minimum resolution of 720 X 480 in a delivery method acceptable to the Engineer. Include a narrative stating the location and explanation of deficiencies with the video. The video image must be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe. Provide identification in the video before each section of pipe filmed, including the pipe location, the project number, the structure number corresponding to the structure number in the Plans for the project, size of pipe, and the date and time. Indicate which pipe is being filmed if multiple pipes are connected to the structure. Notes should be taken during the video recording process. Provide the Engineer with copies of these notes along with the video.

Move the camera through the pipe at a speed of approximately 15 feet per minute but not greater than 30 feet per minute, unless otherwise directed by the Engineer. Mark the video with the distance down the pipe. The distance shall have an accuracy of one foot per 100 feet. The number of units of equipment on hand must be adequate to insure the completion of the work.

Ensure that all equipment to be used is in safe working condition. Repair or remove from the job equipment that is not in safe working condition.

The camera must be operative in 100% humidity conditions. Provide a view of intersecting pipes and drainages structures without diverting from the primary inspection route.

Video the entire circumference of all joints, pick-up holes, and any other suspect areas in order to identify any deficiencies along the entire perimeter of the joint. At every joint and structure, and at significant defects, stop the camera and rotate the camera's view a full revolution to document and measure defects. View all suspect areas in such a way as to make a

clear analysis of the system. Position the camera head perpendicular to all defects requiring measurement by the video micrometer.

At any time during the video inspection, the Engineer may declare the work unsatisfactory and no payment will be made for that section of the work

Perform video inspections on clean dry lines. Inspect storm sewers for cleanliness before the start of video inspection.

Dewatering will be incidental to the other pay items. Do not perform inspections where the flow depth exceeds 5% of the pipe or drainage structure's cross-sectional area, without the prior approval of the Engineer.

Desilting, as necessary to perform the video inspection, will be paid separately. Note the conditions of intersecting pipes and drainage structures on the report and video for the project.

432-2.2 Written Report and GPS Data Collection: Prepare a written report to list all deficiencies of the storm drain pipes, manholes and inlets, along with a detailed map of the storm water system videoed.

The map must include, but is not limited to, the State highway, intersecting side streets, the location of all inlets and manholes, and the diameter and length of all pipes videoed.

The report must include, but is not limited to, deficiencies such as cracked pipes, joint leaks, failed patches, subsidence, intrusions, stained pipe, and significant defects. Specify the coordinate location of each deficiency in the report in the same chronological order as the video. Note the conditions of intersecting pipes and drainage structures on the report and video.

Include GPS coordinates of storm drainage lines locations including type/size/shape of any inspected drainage lines. GPS location point readings should be taken at the center of each structure or grate.

Document defects identified during this review and submit inspection logs.

Include the following in the report:

1. Date, project name, and project number.
2. Street names with starting and ending points.
3. Identify the type of structure, locations, and number (if available).
4. Distances using a tape measure or roll-a-tape
5. Coordinate locations of pipe/culvert/drainage structure deficiencies (i.e. bad joints, offset joints, breaks, or leaks).
6. Centerline distances between structures (if available).
7. Inspection video indicating the structure type/number, coordinates, rim elevation, pipe invert, counter display, and any other relevant data.
8. Coordinate point location (X, Y, Z fields) to represent latitude and longitude in North American 1983 Datum. Precision shall be to the seventh decimal for X and Y, and to the tenth for Z (ex. 25.217111, - 80.3683639, 10.5').
9. A separate column identifying whether it is the begin or end point, change of direction or change of size etc.
10. A written report indicating drainage structure numbers and video counter display numbers
11. Pipe diameter in inches (18", 24", 36", etc.)
12. Pipe material (reinforced concrete, corrugated, galvanized, high density polyethylene, etc.)
13. Pipe shape (round, elliptical, square, rectangular)
14. A detailed map of the storm water drainage system as videoed

Catalog inspection information gathered on inspection forms to produce a report of deficiencies. The expected deliverables must be in a data format that is compatible with ESRI's ArcGIS 10.1 and above; a PDF file of the inspection report cataloging the inspection results; video version of the report showing the inspected pipe; spreadsheet file (.xls format) indicating the structure locations with pipe start and end points, and their associated material, location, identification number, referenced plan set (if available), etc. Results will be made available on computer programs compatible with Department systems.

Submit a complete copy of the final project report and map to the Department within 14 days of completion of all work order documents.

432-3 Method of Measurement.

The quantity to be paid will be the distance, in feet, that the camera physically traveled during inspection of the location specified in the Contract Documents. The distance the camera travels prior to inspection will not be paid.

432-4Basis of Payment.

Price and payment will be full compensation for video inspection and reporting, including dewatering (when necessary) and all equipment and work specified in this Section.

Payment will be made in accordance with the Bid Price Proposal.