



Public Works Department
Engineering Division

STANDARDS AND REQUIREMENTS FOR CLOSED CIRCUIT TELEVISION SURVEYS

PURPOSE AND SCOPE:

This document is intended to provide information and set forth standards for private sewer lateral (PSL) closed-circuit television (CCTV) surveys and recording. The intent is to encompass all CCTV data collecting programs and improve the accuracy and quality of the televising activities and preparation of the CCTV log inspection form. Specifically, it is for use by CCTV operators and technicians, subcontractors, design engineers, CCTV interpreters, and others who may be involved in CCTV data collecting programs.

GENERAL INFORMATION

1. CCTV inspection recordings shall be in VHS tape or DVD format and shall be in color.
2. Camera, power source, lights, and other components for the video inspection shall be equipment that was designed and manufactured for the inspection of laterals and piping which range in size from 2 inches to 100 feet from the sewer mainline.
3. 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 from a range of 6 inches to infinity.
4. Lighting shall be suitable to allow a clear picture of the entire inner pipe wall extending at least 10 feet in front, including black High Density Polyethylene (HDPE) pipe. Lighting for the camera shall minimize reflective glare.
5. All pictures (recordings) shall be in focus, properly illuminated with good contrast, adequate color and tint, and without distortion or outside interference.
6. The camera lens must be kept clean and clear; any fogging due to oil, grease, or other water content or debris that obscures the lens shall be cleaned off before proceeding with the recording operation. The camera is to be operative in 100% humidity conditions.
7. Private sewer lateral video inspection recordings that are to be submitted to the City for review for sewer compliance are to be performed by licensed contractors/plumbers.
8. It is desirable to record during dry weather. The contractor and owner should coordinate to minimize or temporarily stop sewer discharge into the lateral while recording.

9. Include data view display feature capable of showing on tape or DVD the following information.
 - a. Lateral address
 - b. Date and time of inspection
 - c. Contractor name
 - d. Inside pipe diameter and type
 - e. On-going footage counter accurate within 3 percent
 - f. Identify access and starting point for video inspection, e.g., upstream cleanout and location of cleanout
10. The preferred direction is forward from upstream to downstream.
11. Video televising of the entire length of the private lateral is required. Inability or failure to do so due to obstructions in the line, out of alignment joint offsets, or lack of access points will be cause for rejection. If there are no access points, an installation of a new cleanout may be required at the building in order to perform a video inspection of the private sewer lateral.
12. Labeling: Video tapes and DVDs shall be labeled. Labels shall be typewritten or legibly hand printed and include:
 - a. Title: CCTV Sewer Lateral Inspection
 - b. Street address
 - c. Date of inspection:
 - d. Tape provided by "Contractor Name"
 - e. Contractor/Plumber License No
13. Contractor Identification: Provide the name of the firm, the firm's principal place of business, the contact's name and telephone number and company tax identification number, classification of licenses.
14. Pipeline lengths shall be measured from curb face or cleanout to cleanout, or inside structure footprint.
15. Televising shall generally be conducted to show the whole periphery of the pipe. If necessary, the Contractor shall provide a bypass conduit while televising the lateral.
16. Operator shall identify on tape and all potentially illicit connections draining into the storm drain or sanitary sewer systems.

SPECIFICATION:

All CCTV data collecting and recording activities shall henceforth follow and conform to the minimum requirements of this document.

This CCTV survey standard encompasses the following subparts:

Part I - Field Data Collecting Practices

Part II - CCTV Inspection Form

Part III - CCTV Tape/CD Review

PART I - FIELD DATA COLLECTING PRACTICES

All CCTV recording practice will be evaluated against these standards.

1. All recordings shall be in color with the ability to achieve proper balance of tint and brightness. The loss of color or severe redness due to equipment malfunction, and black and white pictures irrespective of quality may be cause for rejection.
2. All pictures (recordings) shall be properly focused and illuminated with good contrast, adequate color and tint, without distortion, or outside interference. The picture while moving forward or on the reverse run should be of adequate light to clearly ascertain with certainty cracks or fractures and their severity in addition to the obvious features (i.e., laterals and joints).
3. At least 70% of the pipe periphery shall be visible above the waterline.
4. The camera operation may be cable-pulled or self-propelling, and may record moving forward or on a reverse pull depending on the pipeline conditions. The preferred direction is forward from upstream to downstream. Camera travel speed shall not exceed 30 feet/minute.
5. The camera lens must be kept clean and clear; and without fogging due to oil, grease, or other water content or debris that obscures the lens shall be cleaned off before proceeding with the recording operation.
6. The camera shall be moved through the line at a uniform rate but in no case at a speed greater than 320 feet per minute. The camera shall be stopped for a minimum of 5 seconds at broken sections, root intrusion, miss-aligned joints or other defects. The camera shall be stopped for a full minute at flowing, undocumented connections, and if needed, pulled back and re-televised to ensure a clear recording of the connection. If needed, the lens and lighting shall be readjusted to ensure a clear, distinct, and properly lighted feature. Camera units shall have adjustable supports and shall be set so the camera axis is generally at the centerline of the pipe.
7. All recordings shall have an audio descriptive narration by the CCTV operator. The operator shall clearly identify in the audio all important features: date, time, project owner's name, street address, number of connections, pull direction, viewing direction, pipe size and material. The operator shall clearly identify the location of the following: all wye-tee junctions, taps, breaks, roots, or other defects as outlined in Part II hereof.
8. The total length of the lateral shall be inspected.
9. The pipe diameter shall be obtained by physical measurement in the upstream (or downstream) cleanout. Pipe material shall be identified.
10. Reverse set-ups for this project are limited. Potential reverses shall be identified and reported to the City for review. The intent is to minimize the number of reverses to those absolutely necessary to complete the inspections.

PART II - CCTV INSPECTION FORM

The form can have any number of pages, depending on the number of defects found. The form should provide general information and inspection defects. The general information should include: property address, date, time, operator name, recording ID. A diagram or a drawing depicting the street address, the approximate location of the cleanout and the north arrow orientation should be included. Pipe diameter; pipe material; shape of the pipe; pipe length; televised footage; counter number at the start and end of the inspection (if recording on video tape); CCTV view in direction; usage of reverse set-up; and comments. The City's standard CCTV Inspection form and the sewer defect classification are to be utilized. All submitted forms are to be typed.

The final two pages of this standard include a sewer defect classification and nomenclature table, as well as a sample of a properly completed video log. The use of the Cities sewer defect classifications and nomenclature is required. The Contractor is to use the back of the video form, or attach a clean sheet as necessary, for the drawing required above.

PART III - CCTV TAPE REVIEW

All CCTV survey taping shall be subject to the review process as described herein. The Contractor shall provide an acceptable picture that is distinct, clear, properly illuminated, of good contrast and without distortion.

GENERAL POLICY

1. All CCTV tapes will be reviewed for acceptability of quality based on the minimum standards established herein, and the CCTV recording logs will be checked against the visible features.
2. A CCTV review form shall be completed conforming to the attached standards, and marked with appropriate acceptability or unacceptability condition.
3. DVD's will be fully viewed to check for acceptability or unacceptability. All inspection log sheets will be subject to audits against the tapes for acceptability.
4. While all videos shall conform to the minimum acceptable standards described herein, the City may in isolated cases accept a line segment recording on the provision that all or a part of the line is sufficiently visible to permit a fairly accurate assessment and design evaluation without doubt or questionable concern.
5. Reviewing the acceptability of a line segment embodies the line from cleanout to cleanout. If only a portion of a line is unacceptable, the entire segment will be deemed unacceptable and must be re-televised from cleanout to cleanout. A line that is partially televised and is incomplete due to an excusable condition (i.e., collapsed line) will be accepted for the televised segment only.
6. CCTV inspection forms will be evaluated against the video and the instructions of Part II hereof for accuracy and completeness.
7. Heavy water flow exceeding the foregoing established criteria would be cause to reject the line segment televised. Surcharging and flooding of the camera lens will not be an excusable condition if it has been artificially created by an upstream surge; roots or debris that create a barrier of the flow or as a result of daytime cycled flow increase. Any flow where the camera towing bridle is underwater and is not clearly a line sag condition will in general, be unacceptable recording conditions and the line segment subject to rejection.
8. Loss of vertical hold, which has an impact on the ability to read and interpret the tape, shall constitute a cause for rejection.
9. All line segments must be televised complete from cleanout to cleanout on the same tape in a continuous run. Partial televising on one tape and then completing the run on another tape is unacceptable.
10. Continuous footage readings for identifying the location of defects must be accurate to within a ± 2 percent tolerance. Defect identifications are to be called out and recorded to the nearest even foot (no decimals). Any inaccuracy in the continuous footage meter or identified defects or features which leave a doubt as to the accuracy of the locations or total length shall render the line segment recording as unacceptable. If the operator has acknowledged that the forward run is unacceptable and has decided to re-televising on the reverse pass, the operator must ensure: 1) the footage markings are correct; and 2) a stop at each feature for 5 seconds for an overall effect of performing a complete re-televising operation on the reverse pass.
11. Any other unidentifiable defect such as equipment interference or malfunction blurred or obscured images from an unknown source that detracts from the ability to completely and with reliable accuracy to read the tape shall constitute a basis for rejection.

NOMENCLATURE AND CCTV LOG

EXAMPLE ON ATTACHED SHEET: Using this nomenclature, the reporting of a Lateral that had multiple cracks; with open joints, with sediment observed that disturbed the flow of water in the pipe and with pipe alignment offset in a vertical direction with flow below the top of lens would have the following nomenclature: **PCM; JO; PSD; PVM**. In the log, the location of these defects must be stated in measurements (in feet) from the start of the inspection.

SEWER CLASSIFICATION TABLE and NOMENCLATURE

COMPONENT		CONDITION		DESCRIPTION	
P	Pipe	C	Cracked	L	Longitudinal
				R	Radial
				S	Spiral
				M	Multiple
NSC	Non Sanitary Connection	RD	Roof Drain Connected		
		AD	Area Drains Connected		
		O	Other		
J	Joint	OS	Offset		
		O	Open		
CO	Clean-out	M	Missing	M1	At back of curb
				M2	At house
		O	Open	M1	At back of curb
				M2	At house
		D	Damaged	D1	At back of curb
				D2	At house
J/P	Pipe and/or Joint	F	Fractured		
		H	Holes		
		B	Broken		
		D	Deformed		
		X	Collapsed		
		RO	Roots	UD	Observable, flow undisturbed
				D	Flow Disturbed
				DIP	Difficult/Impossible to Pass
		I	Infiltration	E	Evidence
				SIL	Seeps into line
				RIL	Runs into line
		D	Debris	SUD	Sediment observed; Flow is Undisturbed
				SD	Sediment observed; Flow is disturbed
				SDIP	Sediment observed; difficult/impossible to pass
				GUD	Grease Observed; Flow is undisturbed
				GD	Grease Observed, Flow is disturbed
				GDIP	Grease Observed; Difficult/impossible to pass
				CUD	Scaling Observed; Flow is Undisturbed
				CD	Scaling Observed; Flow is Disturbed
				CDIP	Scaling observed; Difficult/impossible to pass
		A	Alignment	HL	Horizontal; flow below bottom of lens, <10% of pipe diameter
				HM	Horizontal; Flow below top of Lens, <25% of pipe diameter
				HS	Horizontal; Camera is submerged, >25% of pipe diameter
				VL	Vertical; flow below bottom of lens, <10% of pipe diameter
				VM	Vertical; Flow below top of Lens, <25% of pipe diameter
				VS	Vertical; Camera is submerged, >25% of pipe diameter



Public Works Department
Engineering Division

CCTV Sanitary Sewer Report

Table 1: Property, Owner, and Conditions Report

Property Address: 123 A Street		Date CCTV Inspection Performed: 12/14/06	
Owner's Name: Hillary Smith		Owner's Address: 123 A Street	
Depth of Lateral: 18"	Total Length of Lateral: 20 (ft)	Pipe Diameter: 4 (inches)	Pipe Material: Vitrified Clay
Counter Start Time: 00:00	Counter End Time: 00:15	Total Inspection Time: 15 (min)	
TV Direction: Downstream <input checked="" type="checkbox"/> or Upstream <input type="checkbox"/>		Shape of Pipe: Round	Location Lateral Accessed: Rear of House
Total Footage Televised: 20 (ft)	Weather Conditions: Rain		

Table 2: Contractor Information

Name of Contractor: Easy Does It	City of Berkeley Business License #: 2006-12345	California State License #: 874190
Business Address: 21 O'Ring Road, Stockton, CA 94789		Inspection Start Time: 0810
Phone Number: 209-555-1234	Name of Technician Completing Video: Joe Plumb	Inspection End Time: 0900

Table 3: Condition of Lateral (NOTE: Please refer to the Standards and Requirements for Closed Circuit Television Surveys and use the "Sewer Classification Table and Nomenclature" for the completion of this table.)

Footage	Component	Condition	Comments	Footage	Component	Condition	Comments
3-5	P	C.I.	M/S/L	13	P	C	L
4	MSC	R/C		20	CO	M	MI
9	J	C					

Table 4: Comments Regarding Condition of Lateral

At 4 feet there is a non sanitary sewer connection where the roof drains terminate into the lateral. At 9 feet into the lateral a joint offset was observed. There is a gap that measures about 9/16". At 13 feet it was noted that the pipe had a longitudinal crack. At 20 feet, or the end of the upper lateral, there does not appear to be a cleanout present.

Contractor is to sign below:

I know of my own personal knowledge that the information submitted for ascertaining compliance with the City of Berkeley Municipal Ordinance 17.24 is compliant with all requirements set forth by the City of Berkeley Municipal Ordinance 17.24, inclusive. I declare under penalty of perjury that all submitted information is pertinent to the subject address and to no other.

Name (Printed) Joe Plumb	Title Technician	Date 12/14/06	Signature
-----------------------------	---------------------	------------------	-----------