AI-05-CCTV INSPECTION OF EXISTING PIPELINES PRIOR TO OTHER WORKS

Ver.1 Date: October 2014

1. SCOPE

This section covers the inspection of existing sewer and stormwater pipelines before and after the construction of new sewers, watermains, and other structures that cross them or are close to them.

The work will be carried out using CCTV (closed circuit television) and still digital camera images to directly inspect the internal surfaces these pipes.

2. NETWORK OPERATOR

Pipelines to be inspected may belong to or be operated by Watercare Services, a local authority, or a network operator managing the pipelines for a local authority. Reference herein to the network operator shall include Watercare Services or the local authority where that organisation operates its own network facilities.

3. LENGTH OF PIPE TO BE INSPECTED

The Particular clauses will indicate the name of the network operator responsible for the pipelines that are to be inspected, and a contact person within that organisation.

The pipeline crossing point or area of interest with respect to other structures that is to be inspected, will be also be defined in the Particular clauses. The CCTV inspection shall extend for a distance of at least 3m beyond the area of interest.

4. ACCESS TO PIPELINES AND COORDINATION WITH THE NETWORK OPERATOR

The inspection program is to be coordinated with the network operator and his activities on the pipeline. The inspection work shall be arranged to cause minimum disturbance to his normal use of the pipeline.

The Contractor shall co-ordinate the timing of his inspections to ensure that inspection equipment or personnel safety is not endangered by sudden high flows resulting from the release of stored wastewater, siphon flushing, pumping station operation, or other activities on the pipelines. .

The Contractor shall allow for all costs associated with liaison and planning of the work with the network operator.

5. INSPECTION PROGRAM

The CCTV inspection may commence at any time prior to the new construction. After the pipeline or structure has been completed and the surface has been fully reinstated, the pipelines shall be re-inspected by CCTV.

The video record of the CCTV inspections shall be delivered to the Engineer's representative prior to the Due Date for Completion of the Contract or any Separable Portion or at any other time as required by the Engineer.

6. HOURS OF WORK

The hours of work shall be coordinated with daily or seasonal flows in the pipeline and other site conditions, to utilise the best opportunity to gather the condition information.

When proposing work outside normal daytime working hours full consideration must be given to minimisation of inconvenience to the public. The hours of work shall be subject to the approval of the Engineer or his representative.

The Contractor shall allow in his rates for the working hours that are necessary to satisfactorily carry out the pipeline inspections.

7. TRAFFIC CONTROL

Many pipeline manholes or other pipeline access points are located in roads, and access into these may require diversion of traffic. All work within the road shall be conducted in accordance with the Road Opening Notice issued by the Road Controlling Authority, and with Transit New Zealand's current "Code of Practice for Temporary Traffic Management".

8. WORK ON PRIVATE PROPERTY

The work method, equipment used, and the hours of work for inspections and associated work carried out in private property shall be conducted in a manner that will minimise disruption to landowners, tenants, or members of the public. Any damage to private property shall be repaired at the Contractor's cost. Residents of any private properties affected by inspection works are to be kept fully informed of working plans.

9. SEWER INSPECTION AND WASTEWATER FLOW MANAGEMENT

The Contractor shall liaise with the network operator prior to implementing any changes to sewer operation or provision of any flow control or diversion measures.

To permit inspection of defects at any location on the pipe's circumference, inspections should generally be carried out when flow is very low. If this is not practicable, inspection may be carried out provided that the flow depth does not exceed 15% of the total internal diameter of the conduit. Exceptions may be made to this provision in these particular circumstances.

- The Engineer may authorize inspection to proceed when he considers that reduction of flow to 15% of the pipe depth is impracticable for operational reasons, or unnecessary for the inspection required; or
- At sags or dips in the pipe structure where water is ponded to greater than 15% of pipe diameter.

Where it is necessary to carry out an inspection with the pipe in an empty condition, the Engineer may require the pipe to be emptied. The Contractor shall ensure that this operation does not increase the risk of sewer damage or blockage, or cause any overflowing from the adjacent pipelines.

The following methods may be appropriate for locally reducing flow depths in a sewer.

9.1 HYDRO-BLASTING AHEAD OF THE CCTV CAMERA

Accelerating the flow with a water jet can locally reduce the wastewater level immediately in front of the CCTV camera. The Contractor may employ this technique provided that is does not increase the risk of sewer blockage or damage to the pipes, and the operation is approved by the Engineer for the particular section of pipeline.

9.2 USE OF STORAGE WITHIN THE WASTEWATER NETWORK

Pumping stations, wet wells, and some larger diameter sewers may have capacity that can be utilised to contain flow for short periods. The storage time available may be sufficient to complete CCTV condition inspection in the downstream sewer without the presence of a wastewater flow.

Storage may be utilised by shutting down a pump station, or blocking the upstream end of the pipe section with an inflatable bag or plug (Vetter Bag).

Pumping station shutdowns or the installation of any flow-holding device shall be authorised by the network operator.

Alterations to the automatic controls of any pumping station will be carried out only by network operator's personnel, and all changes to normal flows must be under the direct supervision their staff. All possible overflow outlet points, upstream of the installed blockage or shut down pumping station, must be continuously monitored while the sewer flow is isolated or restricted in any such operation.

9.3 BYPASS PUMPING

Bypass pumping may be utilised to temporarily divert flow around a section of pipeline to be inspected. The Contractor shall provide a detailed bypass pumping operational plan for assessment and written approval of the Engineer and the network operator. The work must be carried out under the direct supervision of, and in cooperation with the network operator's staff.

10 PIPELINE CLEANING

The inside surface of the pipeline conduit must be clear of fat, sediment and loose material, to the extent that the pipe material surface can be clearly viewed using a CCTV Camera. The Contractor shall investigate the pipeline before beginning the recorded CCTV inspection to determine the need for any cleaning.

Where the Contractor identifies any need for cleaning, the method and execution of such cleaning is subject to the approval of the Engineer or his representative, who will continuously monitor all cleaning operations.

The Contractor shall ensure that all debris cleaned from the section of pipeline to be inspected is removed from the pipeline immediately downstream of the working area, or at such other site as may be approved by the Engineer.

11 CCTV PIPELINE INSPECTION AND VIDEO RECORD

The video data, pipeline grading and image reports, and any other pipeline inspection information is to be compiled and presented in the current WSL Excel spreadsheet format to be obtained from the Wastewater Operations Point of Contact.

Inspection and reporting of condition data shall conform in general to the standards set out in the "New Zealand Pipe Inspection Manual (Second Edition)".

Watercare may require the use of additional or alternative condition codes or methods for describing and quantifying condition.

The video records shall be submitted on DVD, and inspection log reports shall be provided as files on a separate CD.

11.1 OVERLAYED TEXT INFORMATION

Text Information overlaid on the video record shall follow consistent format and content, and shall be displayed on the video record for 15 seconds. The overlay information provided on the running video view shall be positioned so as to minimise obstruction on the picture of pipeline faults or pipe alignment information.

The Start Header shall include the following information,

a) Sewer or stormwater pipeline name

b) Nearest street address to the setup manhole

c) Pipe diameter / dimensions as measured in the manhole by the Contractor

d) The pipe shape, and material designation

e) The numbers and depths of the upstream and downstream manholes or access points

f) The setup manhole number

g) The day, date and time of the inspection

The running video view of the pipe shall display overlay text including the following information:

h) The running meterage from the start manhole or access point

i) The upstream and downstream manhole numbers

j) Camera orientation

k) Inclinometer reading

The end inspection page shall display text that identifies

l) The 'End of Inspection' caption and the reason for abandonment where applicable

m) Appropriate references to related surveys

11.2CAMERA SPECIFICATION, POSITIONING, AND TRACTOR SPEED

The CCTV camera shall proceed at a height corresponding to the centreline of the pipeline ±10% of the pipe's internal diameter. The speed of the camera shall not exceed 0.2 m/sec.

The camera shall be a pan and tilt type with a zoom capability.

11.3INSPECTION COMMENCEMENT

The camera shall be set to record immediately before entering the manhole, and shall be kept running until the end of the inspection. The pipeline survey shall start with a clear view of the pipe, with the on-screen display indicating the measured distance the centre of the setup manhole / node to the area of view immediately in front of the camera. A continuous record of the camera picture over the total duration of the inspection shall be made on video and delivered to the Engineer as part of the asset condition information required.

The microphone shall be set to record fault comments and other significant features of the inspection, for the entire duration of the inspection.

11.4VIDEO IMAGE QUALITY

The video picture shall be clear and free from fog or mist to the extent that it should be possible to clearly judge vertical and horizontal alignment of the pipeline. The video shall be of acceptable visual quality so that the pipe wall material and all associated defects can be clearly and easily identified. The photos in Appendix A provide an indication of a satisfactory standard of general image quality, and also show an unsatisfactory level of quality.

12 RECORDS AND ASSET CONDITION INFORMATION

12.1CCTV LOG RECORDS

The inspection log shall be part of an electronic record in the current WSL Excel spreadsheet format (see Appendix B) to be obtained from the Wastewater Operations Point of Contact, and

shall identify all of the defects, asset condition information, dimensions, and other data shown on the video record or otherwise required from the inspection.

12.2 VIDEO RECORD

The video record shall comply with all the requirements of Clause 11 CCTV Inspection, and video record.

12.3 STILL PHOTOGRAPHIC IMAGES

The Contractor shall deliver a still image of every fault that is visible on the video record. The facility code, asset number, start manhole, distance in metres from the start manhole and view orientation of the image shall be clearly readable on each image. These images are to be included on the inspection log CD.

13 ABANDONMENT OR POSTPONEMENT OF INSPECTION

Where the condition of the pipeline is such that the Contractor's equipment is at risk, or when changing flows prevent the Contractor from complying with this specification or other terms of his engagement, he shall take such video recordings as are possible without subjecting his equipment to unreasonable risk, before withdrawing from the pipeline. Upon withdrawal of the CCTV camera from the pipeline, the Contractor shall immediately advise the Engineer. The Engineer may issue written instruction to the Contractor requiring him to abandon, postpone, or proceed with the inspection.

13.1 ABANDONMENT

Except where the Contractor cannot physically continue with the inspection due to circumstances beyond his control, the Contractor will require the Engineer's written instruction to abandon the inspection before his obligation to complete the work is removed. The Contractor will be paid for all work completed up to the point of abandonment.

13.2 POSTPONEMENT OF THE INSPECTION

Where flows in the pipeline, or other conditions such as steam or fog, are such that the quality of the inspection recording falls below the standards required by this specification, the Contractor shall postpone the inspection until such time as acceptable results can be achieved.

14 COPYRIGHT

All video records and asset condition records, including all rights associated with them, shall become the property of Watercare Services immediately upon payment for the work.

APPENDIX A - VIDEO IMAGE QUALITY

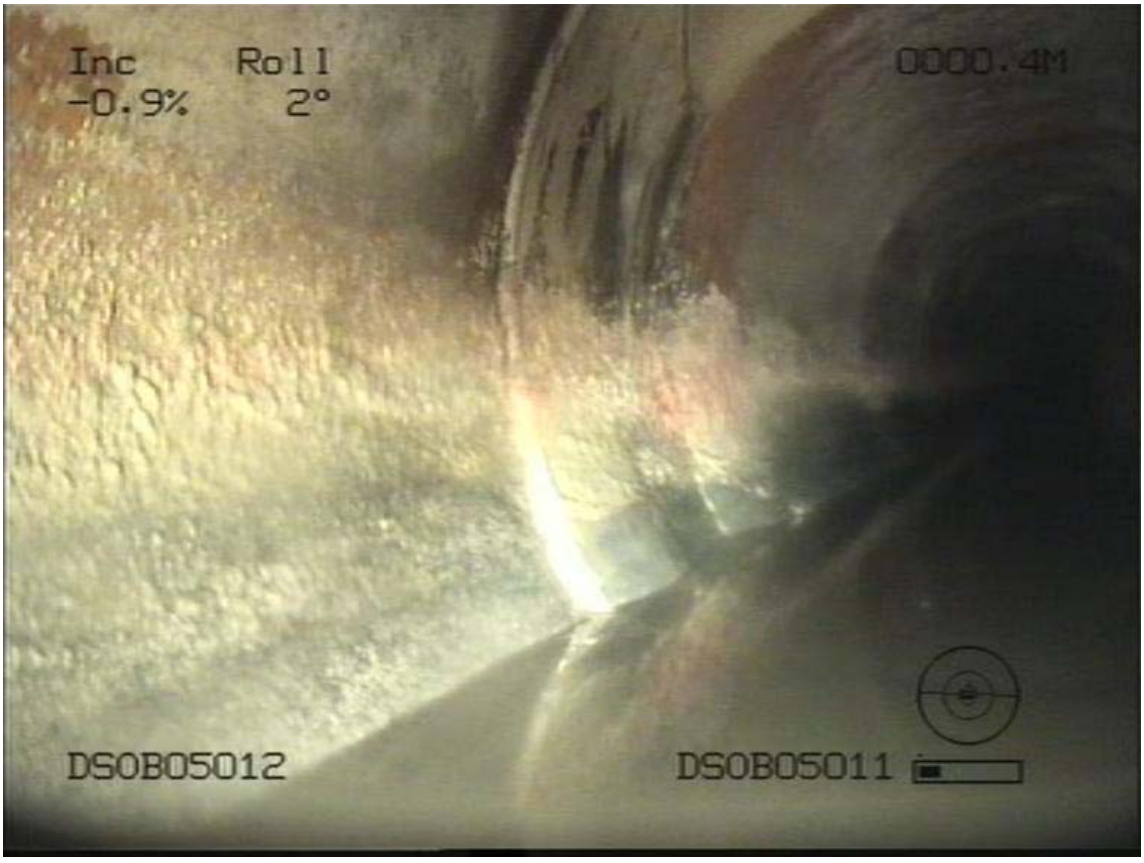
Refer to section 11.4

Examples of acceptable quality

Example 1.

Example 2.

Example of unacceptable quality



Example 1.

Example of unacceptable quality

Example 2.

APPENDIX B – EXAMPLE OF LOG SHEET

EXAMPLE OF ACCEPTABLE LOG SHEET

WSL Ref No.	Sheet No.	Equip. ID	Date Started	Time Started	Time Completed
9999	01	10004226	17.12.08	12.44	13.45

Facility Name	Facility Code	Weather	Flow Depth
Branch 7B Sewer Mount Eden	DSOB7B	Showers	0.1

Contractor	Operator	Record No.
Auckland CCTV Ltd.	Johnny Smith	B7B 17.12.08

Node Type	Upstream MH/Node No.	Street No.	Street Name
SMH	DSOB7B005	5	Ace Place, Mt Eden

Node Type	Downstream MH/Node No.	Street No.	Street Name
SMH	DSOB7B004	Crn of	Alexander Street, Mt Eden

Set-Up MH U/D	Line Length (M)	Surveyed Length (M)	Diameter (MM)	Joint Spacing (M)	Material	Shape	Use
U	160.91	160.91	300	0.6	EW	CP	F

Currency of Inspection	Status of Pipe	Inspection Completeness	Video Rec Format	Date of Entry
CI CURRENT	OC ORIGINAL	IC COMPLETE	DVD	17.12.08

Comments	Condition Score
Job # 52346 - Various Cracks in line - 300mm PIPE	

Video Reading	Distance From (m)	Condition Code	Severity	Position from	Position to	Photo No.	Remarks
0:00:00	0	IS					Starts at DSOB7B005 Going downstream
	0.69	CC	S	1	9		
	5.93	CL	S	3			
	6.5	CL	S	1			
	9.02	ED	S	5			
	10.21	ED	S	5	6		
	12.67	CL	S	5			
	14.55	CM	S	4	5		
	17.55	CM	S	3	9		
	18.8	CM	S	10	1		
	20.13	CL	S	3			
	20.13	GP				9999_01_01.jpg	CONDITION PHOTO
	21.94	CL	S	1			
	23.46	CL	S	8			
	25	CL	S	3			
	25.6	CL	S	8			
	26.22	CM	S	3			
	40.2	GP				9999_01_02.jpg	CONDITION PHOTO
	56.22	GP				9999_01_03.jpg	CONDITION PHOTO
	70.14	ED	S	5	6		
	72.13	IP	S	6	11	9999_01_04.jpg	CONDITION PHOTO - Minnor via joint

EXAMPLE OF UNACCEPTABLE LOG SHEET

WSL Ref No.	Sheet No.	Equip. ID	Date Started	Time Started	Time Completed
		104502	17.12.08	12.44	13.45

Facility Name	Facility Code	Weather	Flow Depth
Branch 7B	DSOB7B	Showers	0.1

Contractor	Operator	Record No.
Auckland CCTV Ltd.	Jimmy Smith	B7B 17.12.08

Node Type	Upstream MH/Node No.	Street No.	Street Name
SMH	MH5		Ace Place, Mt Eden

Node Type	Downstream MH/Node No.	Street No.	Street Name
SMH	MH4		Alexander Street, Mt Eden

Set-Up MH U/D	Line Length (M)	Surveyed Length (M)	Diameter (MM)	Joint Spacing (M)	Material	Shape	Use
	160.91			0.6		CP	F

Currency of Inspection	Status of Pipe	Inspection Completeness	Video Rec Format	Date of Entry
				17.12.08

Comments

Condition Score

Video Reading	Distance From (m)	Condition Code	Severity	Position		Photo No.	Remarks
				from	to		
0:00:00	0	IS					Starts at MH5
	0.4	CC	S	1	9	4256_1_01	
	6.6	CL	S	9		4256_1_02	
	50						End at MH4