

## **APPENDIX C**

### **SUPPLEMENTARY FORCEMAIN INSPECTION INFORMATION**

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## Memorandum

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Date: June 2007  
 To: Marv McDonald  
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 Subject: WEWPCC Forcemain Twinning – Existing Forcemain Inspection  
 Project number: D265-202-01

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### Distribution:

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Logistics pertaining to the internal CCTV inspection of the WEWPCC forcemain are provided below.

#### Forcemain Access

Internal CCTV inspection of the forcemain can only be undertaken while it is out of service for an extended period of time, and for the majority will only be possible after the new forcemain is completed. Access to the interior of the forcemain is only practicable where existing blind flanges or fittings can be removed, as at the seven buried inspection manholes and three of the four subsurface valve chambers:

- VC1 –three blind flanges are available in tee and cross fittings
- VC2A – one spool piece may be removed to provide access to the 600mm forcemain to the west
  - one check valve may be removed or dismantled to provide access to the 900mm forcemain to the west
- VC2B – access to the 600mm forcemain to the north is only possible by removing a 600mm Gate Valve
- VC5 – access is possible through a blind flange, but an upstream check valve must also be dismantled or removed

One additional location, immediately outside the pumping station, may become accessible when the deteriorated steel piping is removed for replacement

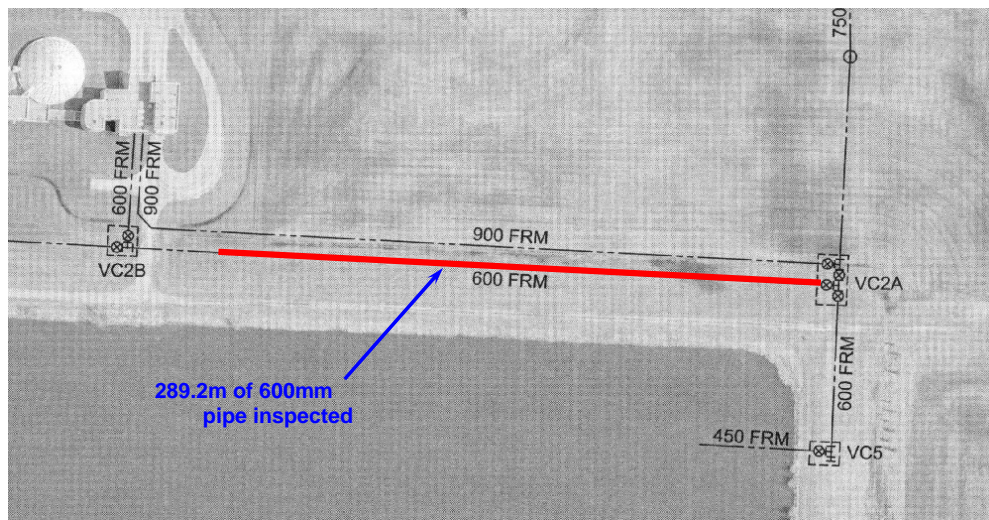
Inspection manholes are tee fittings in which the vertically oriented 500mm-diameter branch has been closed with a blind flange, each of which is secured with 20 stainless steel bolts, and encased in expanded metal reinforced mortar. These all should be exposed for external inspection and assessment anyway, so all can be considered potential forcemain access points. All inspection manholes are located in grassy or agricultural field areas, and can be accessed directly from either Wilkes Ave or the service road on the west side of PTH 100.

A detailed listing of forcemain features, including all inspection manholes and valve chambers, is attached to this memo. High and low points on the forcemain are shown on Figure 2. The maximum range of CCTV inspection equipment has been assumed to be 300m.

### Inspection Methodology

It is desirable to clean the pipe before it is inspected. If two forcemain access points are available, the flusher and vacuum trucks will be positioned at the downstream point, and the CCTV truck will be positioned at the upstream point. It is assumed the flusher will perform at least two cleaning passes of the pipeline, with the effluent being removed by the vacuum truck. The flusher hose will then be sent up the line to the upstream manhole where the CCTV equipment will be coupled to it using a chain or cable, to assist the tractor through slippery areas and around bends.

If only one access point is available, the pipe will first be cleaned, then the cleaning equipment will be moved away to provide room for the CCTV equipment. Inspection range will be limited by the traction of the tractor wheels, or the presence of bends, which can cause the tractor to topple over.

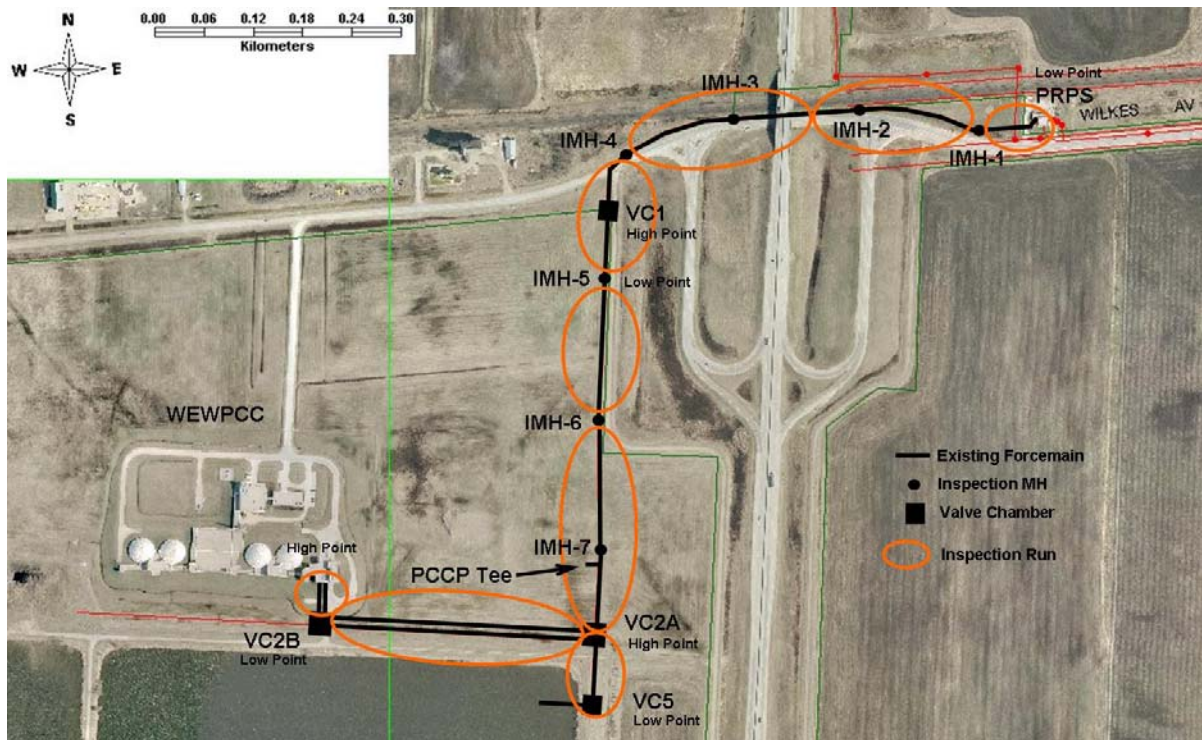


**Figure 1 - Forcemain Inspected on 27 Jan 2006 (bends near VC2A not shown)**

### Methodology for Inspection of the WEWPCC Forcemain

Please note the following conditions:

- The majority of the 600mm forcemain between VC2A and VC2B has been inspected (Figure 1)
- Consider at this time that the remainder of the 600mm forcemain, as well as the two pipes running north-south into the treatment plant at VC2B are not accessible and will not be inspected.
- Access to the parallel 900mm forcemain (VC2A and the bends near VC2B) will be possible when a valve is removed from VC2A. Note also that this pipe grades westward (is 0.84m lower near VC2B than at VC2A), and it has no drain. Therefore, the flushing equipment will have to pull the sewage back to VC2A to enable the inspection.



**Figure 2 - Proposed CCTV Inspection runs for WEWPCC Forcemain**

Forcemain inspection should proceed as outlined below, based on access points and forcemain elevations. All inspection manholes should be exposed for external inspection, but it should not be necessary to remove all the blind flanges for access. Those that must be removed can be temporarily closed daily using plywood covers. Sewer inspection contractor will need assistance removing and installing the blind flange in VC5.

- **600mm  $\phi$  from VC5 to VC2A (if during VC2A renovations)**
  - In VC5, remove blind flange from tee and / or remove or dismantle the 450mm check valve
  - In VC2A, remove existing 450mm plug valve
  - Flusher & vac trucks clean pipe from VC5, while CCTV Van inspects from VC2A
  - Inspection distance 77.4m
- **600mm  $\phi$  from VC5 to VC2A (if after VC2A renovations)**
  - In VC5, remove blind flange from tee and / or remove or dismantle the 450mm check valve
  - Flusher & vac trucks clean pipe from VC5
  - CCTV Van then inspects northward from VC5, to closed valve in VC2A
  - Inspection distance 77.4m

- **750mm  $\phi$  from VC2A to PRPS (after new forcemain is commissioned)**
  - From VC2A to IMH-6
    - Remove blind flange from IMH-6
    - Flusher & vac trucks set up at IMH-6, and clean pipe northward, in direction of gravity flow, from VC2A to IMH-6
    - Flusher & vac trucks then move to IMH-5
    - CCTV Van set up at IMH-6, inspects pipe southward through IMH-7 to VC2A
    - Inspection distance 269m
  - From IMH-6 to IMH-5
    - Remove blind flange from IMH-5
    - Flusher & vac trucks set up at IMH-5, and clean pipe northward, in direction of gravity flow, from IMH-6 to IMH-5
    - CCTV Van set up at IMH-6, inspects pipe northward to IMH-5
    - Inspection distance 168m
  - From IMH-5 to IMH-4
    - Remove blind flange from IMH-4
    - Flusher & vac trucks set up at IMH-4, and clean pipe northward, in direction of gravity flow, from IMH-5 to IMH-4. Flusher will also assist CCTV tractor through bend.
    - CCTV Van set up at IMH-5, inspects pipe northward to IMH-4
    - Inspection distance 153m
  - From IMH-4 eastward
    - Flusher & vac trucks set up at IMH-4
    - Flusher advances cleaning equipment to maximum distance eastward and cleans pipe westward, against direction of gravity flow, back to IMH-4. Total inspection distance IMH-1 to IMH-4 = 465.86
    - CCTV Van set up at IMH-4, and inspects pipe eastward through IMH-3, as far as possible
  - From IMH-1 westward
    - Remove blind flange from IMH-1
    - Flusher & vac trucks set up at IMH-1
    - Flusher advances cleaning equipment to maximum distance westward and cleans pipe eastward, in direction of gravity flow, back to IMH-1
    - CCTV Van set up at IMH-1, and inspects pipe westward as required to overlap upstream inspection run.
  - From IMH-1 eastward
    - Flusher & vac trucks set up at IMH-1
    - Flusher advances cleaning equipment to maximum distance eastward and cleans pipe westward, against direction of gravity flow, back to IMH-1
    - CCTV Van set up at IMH-1, and inspects pipe eastward as far as possible (first 45° bend)

Since inspection manholes IMH-2 and IMH-3 are offset only 1.5m from the railway r.o.w., it was proposed that these manholes not be used for inspection access. The use of IMH-7 was also avoided as it is located well within the agricultural field, and it may be difficult for the Contractor to access that location with heavy equipment. That said, these additional manholes can be utilized to minimize inspection distances, and ensure that cleaning is conducted in the direction of gravity flow as much as possible.

- **900mm  $\phi$  from VC2A to bends near VC2B (after new forcemain is commissioned)**
  - Remove or dismantle existing 600mm Check Valve in VC2A
  - Flusher & vac trucks set up at VC2A
  - Flusher advances cleaning equipment to maximum distance westward and cleans pipe eastward, against direction of gravity flow, back to VC2A. since this segment of forcemain is not equipped with a drain, inspection will be limited by the amount of sewage the flusher can draw from the line
  - CCTV Van set up at VC2A, and inspects pipe westward as far as possible. Man entry may be required to re-orient the tractor if it topples while negotiating the horizontal bends located immediately west of VC2A
  - Inspection distance 340m
  
- **600mm  $\phi$  from WEWPCC to VC2B (after new forcemain is commissioned)**
  - Close 600mm Gate Valve on 600mm forcemain inside WEWPCC
  - Remove dresser-style coupling and flanged pipe stub, currently attached to 600mm Gate Valve, inside WEWPCC
  - Cleaning of this forcemain prior to CCTV inspection is not possible
  - Portable tractor camera and recording equipment set up inside WEWPCC
  - Camera advances into forcemain, downslope to VC2B
  - Inspection distance 57m



**WEWPCC Forcemain Internal Inspection  
 Forcemain Features - Stations & Elevations**

Feature	Dist. Betw (m)	Station (m)	Station (ft)	Elev (ft)	Elev (m)
<b>750mm Forcemain from PRPS to VC2A</b>					
Connection to PRPS	6.58	-10.13	-33.25		
Connection Steel-PCCP	2.33	-3.55	-11.66		
45 Bend (PCCP)	53.57	-1.22	-4	769.47	234.53
IMH-1	161.55	52.35	171.75		
IMH-2	150.63	213.90	701.78		
IMH-3	153.63	364.53	1195.97		
IMH-4	8.24	518.17	1700.02		
63 Sweep Bend	55.00	526.40	1727.04	771.5	235.15
VC1 (cross-tee joint)	89.17	581.40	1907.47	772.5	235.46
IMH-5	167.85	670.57	2200.02	772	235.31
IMH-6	167.85	838.42	2750.72		
IMH-7	7.60	1006.27	3301.42		
Tee to West (Future)	101.04	1013.87	3326.35		
VC2A (CL tee to west)		1114.92	3657.86	772.5	235.46
<b>600mm Forcemain from VC2A to VC5</b>					
VC5 (CL of tee to Cell 1)	77.37	61.95			235.59
VC2A (inside of S wall)		139.32			235.68
<b>600mm Forcemain from VC2A to VC2B</b>					
VC2A (tee to west)	342.93	131.37			235.60
VC2B (tee to north)		474.30			235.05
<b>600mm Forcemain from VC2B to WEWPCC</b>					
WEWPCC	55.27	172.38			238.32
VC2B (tee to north)		227.65			235.05
<b>900mm Forcemain from VC2A to Vert Bend near VC2B</b>					
VC2A (tee to west)	339.93	131.37			235.60
Vert Bend near VC2B		471.30			234.76
<b>900mm Forcemain from Vert Bend near VC2B to WEWPCC</b>					
WEWPCC	49.62	172.38			238.19
Vert Bend near VC2B		222.00			234.76