

City of Winnipeg 2015:

400mm (16-in) Doucet St - Goulet St Watermain Seine River Crossing

Condition Assessment Report, Standard Analysis



PICA – Pipeline Inspection & Condition Analysis Corporation
(A Subsidiary of Russell NDT Holdings Ltd.)

RFT ILI Tool
400mm (16-in) Steel

Between Doucet Street and Goulet Street
Winnipeg, MB

PICA Project: Winnipeg 8007

Inspection Date:	October 19-24, 2015
Report Submission:	February 2, 2016
Operators:	P. Ryhanen, G. Bouchard, B. Senka, G. Hubbard, D. Barron, D. Burton
Analyst:	J. Kim
Reviewers:	J. Regala
Report Revision:	1.0

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Condition Assessment Report, Standard Analysis

Executive Summary

PICA, under contract with AECOM, inspected a number of Water River Crossings for the City of Winnipeg using Remote Field Testing (RFT) Technology between October 19 and 24, 2015. This report documents the results of the RFT inspection of the 400mm (16in) steel Doucet-Goulet Watermain, which crosses the Seine River. The inspected portion spans between two newly installed access wyes at Doucet St and Goulet St (refer to the line map on page 4). Technical problems with the RFT tool were encountered during the first two days, and traced to a glitch in the exciter drive unit. The final inspection was performed on October 24 after repairs and functional testing. The results reported herein document PICA's findings.

As noted in the supplied pipeline drawings, this watermain is comprised of asbestos cement (AC) and steel pipe. Approximately 87m of the total inspected distance of 174m is comprised of AC pipes. The AC pipes are non-ferrous in nature, and are therefore excluded from this report.

The RFT analysis found the inspected steel section to be in *excellent* condition, as there was no localized wall loss detected above the threshold-of-detection for the RFT Tool.

Table 1 provides an overview of the RFT findings on 16in Doucet-Goulet Watermain River Crossing.

Table 1: Feature Indication Summary	
Inspected Length	173.82m* *includes ~86.60m of asbestos cement pipe
Number of Steel Pipe Sections:	15
Number of Analyzed Steel Pipe Sections:	15
Average Wall Thickness:	100%
Number of Steel pipes without localized wall loss indications:	15
Number of Steel pipes with localized wall loss indications:	0
• Number of Steel pipes in 'good' condition (>75% RW):	15
• Number of Steel pipes in 'fair' condition (50-74% RW):	0
• Number of Steel pipes in 'poor' condition (<50% RW):	0
Total number of wall loss indications reported:	0
Number of Regular Girth Welds:	7
Number of Flange Connections:	8
Number of Elbows:	2

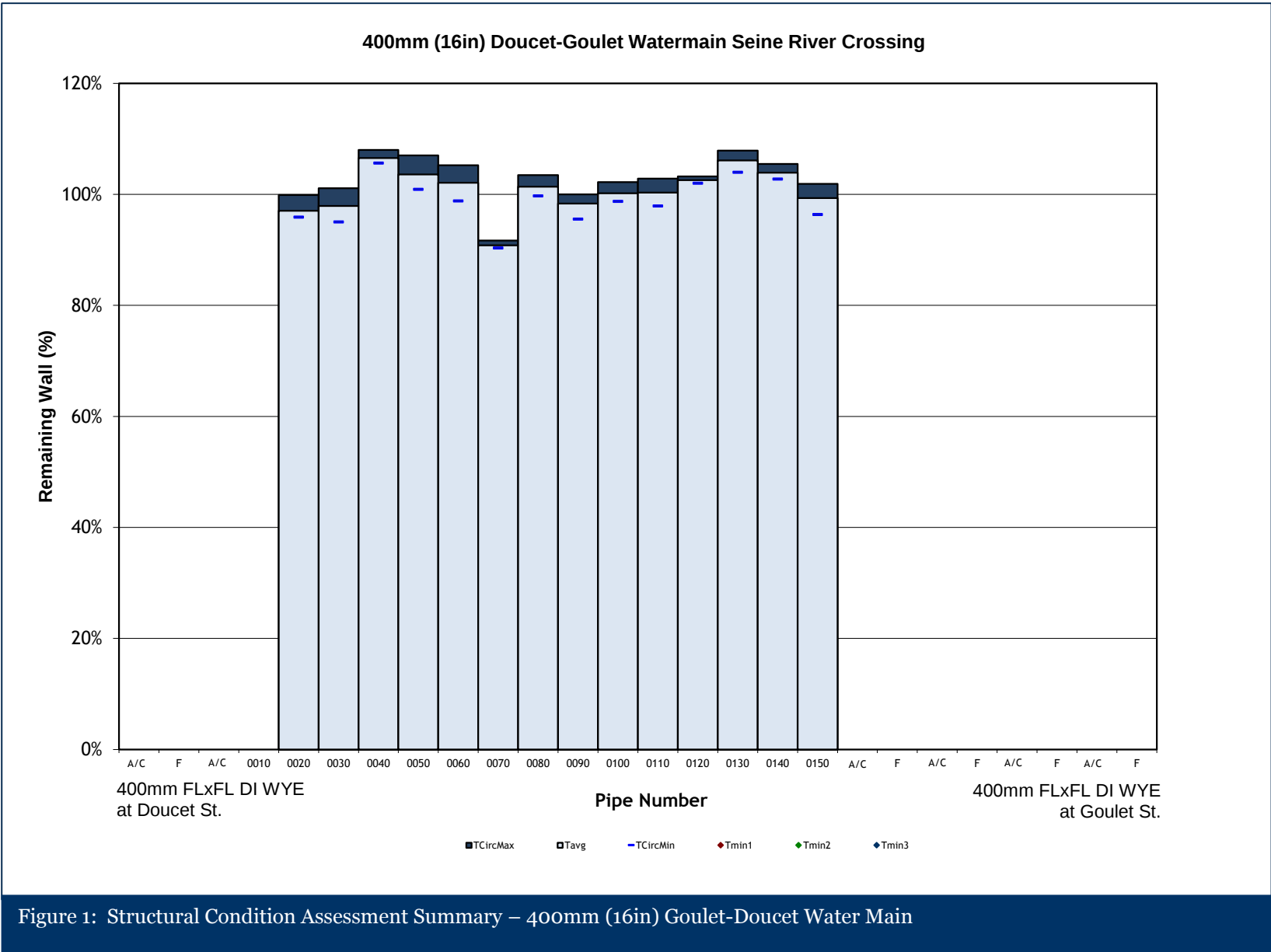


Figure 1: Structural Condition Assessment Summary – 400mm (16in) Goulet-Doucet Water Main

Table 2: Inspection Overview

Client:	City of Winnipeg	Location:	Winnipeg, MB
Line Name:	Doucet-Goulet Watermain River Crossing	Pipe Diameter:	400mm (16in)
Material:	Asbestos Cement (86.60m) Steel (87.22m)	Year Installed:	1953
Nominal Wall Thickness:	Unknown <i>*Based on inspection frequency used, it is believed to be thicker than 0.375in.</i>	Break History:	None provided
Inspection Date (s):	October 19 – 20 & 24, 2015		
Inspected Length:	173.8m		
Lead Technician:	P. Ryhanen	Technician(s):	G. Bouchard, B. Senka, G Hubbard, D. Barron, D. Burton
Launch Access:	400mm FLxFL DI WYE at Doucet St		
Retrieve Access:	400mm FLxFL DI WYE at Goulet St		

Operational Comments:
October 19 & 20, 2015

Initial inspections were performed but only 15% of the length logged, due to poor data quality. The cause was later traced to the exciter coil drive, which had failed shortly into the first run.

October 24, 2015

7:00am: Arrived at Tri-Cor to prepare RFT tool.

11:30am: Travel to site and set up to launch from Goulet St site.

1:00pm: First run was performed using the primary frequency setting.

Once the tool reached the Doucet St end, retrieve run commenced.

Difficulties were encountered attempting to extract the tool through the Goulet St wye.

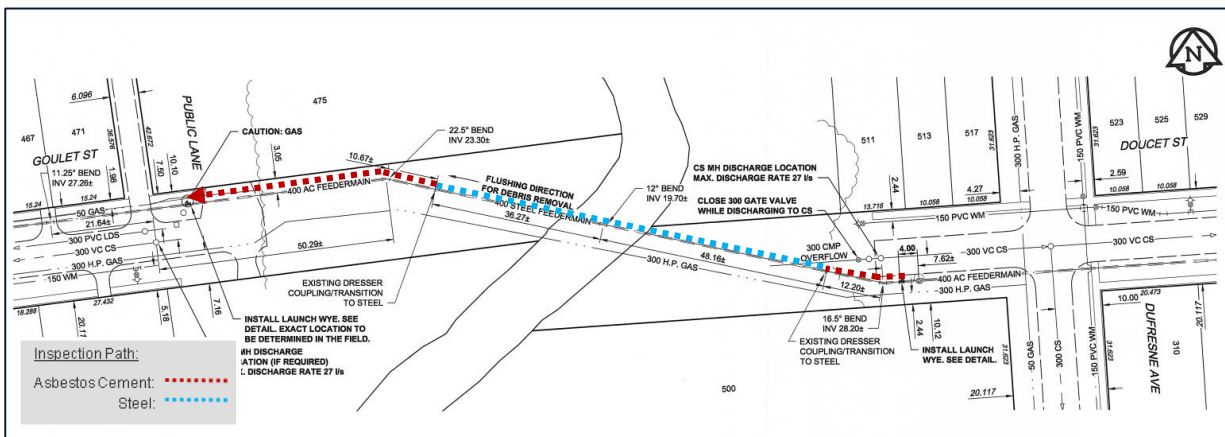
Tool was pulled back eastward in order to extract it through the Doucet St wye.

2:00pm: A second RFT run was launched from the East side.

4:30pm: Second run finished. The data was downloaded and the quality assessed immediately.

6:30pm: A third RFT run using a different frequency setting based on the previous two runs was performed, again from the Doucet St side.

9:30pm: Tool arrived and site broken down.



Analysis Results

Location Reporting, Pipe Lengths & Features

The total logged distance for the 16in Doucet-Goulet Watermain Seine River Crossing was 173.82m. This distance includes approximately 86.60m of asbestos cement (AC) piping that exists at both ends of the main. More specifically, a total of 16.15m of AC piping is found in the east end near Doucet St and a longer 70.45m AC section in the west end near Goulet St. Asbestos cement piping is non-ferrous in nature and therefore was excluded from the analysis.

The zero datum point was set at the west end flange of the newly installed 400mm FLxFL DI WYE at Doucet St. The inspection started on the east side of Seine River and ended on the west side near Goulet St.

The average length of the common and standard steel pipe is 6.22m (20.41ft) with shorter pieces adjacent to the asbestos cement transition points. The RFT analysis identified two different joint connection types in the steel section: welded and flanged connections. Of all the flanged connections, the flanges located at 6.38m and 66.62m appear differently than the rest. The RFT data also identified three significant deflections in the inspection section: 16° elbow, 12° vertical deflection and 22° elbow. Both elbows and the vertical deflection were confirmed using pipeline documents provided by the client.

General Wall Thickness

Pipe sections longer than 1.5m were analysed to obtain the average remaining wall thickness calculated over the length of the section. The measured average wall thickness for the steel section of the 16in Doucet-Goulet Watermain River Crossing is 100.0%.

Due to manufacturing tolerances, fluctuations of $\pm 10\%$ in the individual PARW values are common. Variations outside the normal $\pm 10\%$ spread can be an indicator of a different nominal wall thickness (NWT) or point towards a problem like aggregate pitting or general wall loss. Largely, the inspected pipes exhibited PARW values that are within the manufacturing tolerances. Pipe 0070 was found with the lowest PARW value of 91%, which is still within the aforementioned tolerance.

Local Wall Thickness

The RFT analysis found the inspected steel section to be in *excellent* condition, as there were no localized wall loss detected above the Threshold-of-Detection for the tool.

Table 3, in the subsequent pages, details the average remaining wall values for the inspected section. The same results are shown graphically on page 3.

Data Quality

The overall quality of the data collected for the 16in Goulet-Doucet line was satisfactory. There were instances of high-frequency noise that occurred throughout the run. The noise was likely caused by the increased tuberculation levels in the line, preventing the tool to travel smoothly during the inspection. In areas where there was significant noise, it is possible that the noise may have masked shallow and small-medium defects.

Table 3: Pipe List and Wall Thickness Readings – 400mm (16in) Doucet-Goulet Watermain Seine River Crossing

Pipe No.	Pipe Location Joint Connection Type			Tavg RW (%)	Local Wall Thickness <i>Grey-highlighted rows are asbestos cement pipes, which were not analyzed.</i>									Comments
	Start (m)	End (m)	Length (m)		Tmin1			Tmin2			Tmin3			
					RW (%)	Location (m)	Clock Position	RW (%)	Location (m)	Clock Position	RW (%)	Location (m)	Clock Position	
A/C	0.00	5.76	5.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Zero datum point is at the west end flange of the newly installed 400mm FLxFL DI WYE at Doucet St; Asbestos cement pipe.
F	5.76	6.38	0.62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16° Elbow (Metallic)
A/C	6.38	16.15	9.77	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	End of asbestos cement section
0010	16.15 <i>Weld</i>	17.58 <i>Flange</i>	1.42	N/A										Start of steel section
0020	17.58 <i>Flange</i>	22.80 <i>Weld</i>	5.22	97%										
0030	22.80 <i>Weld</i>	29.78 <i>Flange</i>	6.98	98%										
0040	29.78 <i>Flange</i>	36.09 <i>Weld</i>	6.31	107%										
0050	36.09 <i>Weld</i>	42.06 <i>Flange</i>	5.97	104%										
0060	42.06 <i>Flange</i>	48.58 <i>Weld</i>	6.52	102%										
0070	48.58 <i>Weld</i>	54.34 <i>Flange</i>	5.76	91%										
0080	54.34 <i>Flange</i>	60.15 <i>Weld</i>	5.81	101%										
0090	60.15 <i>Weld</i>	66.62 <i>Flange</i>	6.47	98%										
0100	66.62 <i>Flange</i>	72.01 <i>Weld</i>	5.39	100%										12° vertical deflection at 66.62m.
0110	72.01 <i>Weld</i>	79.04 <i>Flange</i>	7.03	100%										
0120	79.04 <i>Flange</i>	84.33 <i>Weld</i>	5.29	103%										
0130	84.33 <i>Weld</i>	91.33 <i>Flange</i>	7.00	106%										
0140	91.33 <i>Flange</i>	98.45 <i>Weld</i>	7.12	104%										

Table 3: Pipe List and Wall Thickness Readings – 400mm (16in) Doucet-Goulet Watermain Seine River Crossing

Pipe No.	Pipe Location <i>Joint Connection Type</i>			Tavg RW (%)	Local Wall Thickness <i>Grey-highlighted rows are asbestos cement pipes, which were not analyzed.</i>									Comments
	Start (m)	End (m)	Length (m)		Tmin1			Tmin2			Tmin3			
					RW (%)	Location (m)	Clock Position	RW (%)	Location (m)	Clock Position	RW (%)	Location (m)	Clock Position	
0150	98.45 <i>Weld</i>	103.38 <i>Flange</i>	4.93	99%										End of steel section
A/C	103.38 (Flange)	109.85	6.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Start of asbestos cement section
F	109.85	110.40	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Metallic Piece
A/C	110.40	111.09	0.70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
F	111.09	111.60	0.51	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Metallic Piece
A/C	111.60	111.99	0.38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
F	111.99	112.89	0.90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	22° Elbow (metallic)
A/C	112.89	173.83	60.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	End of run is near the newly installed 400mm FLxFL DI WYE at Goulet St.

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Standard of Care

In performing the services provided, PICA Corp uses the degree, care, and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by PICA Corp.