

January 26, 2018



Sean Currier, Public Works Director  
Town of Hampden  
106 Western Avenue  
Hampden, ME 04444

Re: Task Order 17 – Sewer Inspection Results Engineering Support

Dear Sean:

The following is our summary review of the results of the 2017 sewer system inspection that was conducted by Ted Berry Company, per Task Order No. 17. The scope of this Task Order is to provide ongoing engineering support including a review of the sewer inspection results, improvement recommendations, and support with implementation of recommendations.

**Background**

The Town of Hampden (Town) contracted with Ted Berry Company to provide sewer and manhole inspection services for a multi-year contract. This work is being done to address compliance with Combined Sewer Overflow (CSO) regulations, which requires elimination of infiltration and inflow (I/I) induced sewer overflows as well as reducing the excess volume of wastewater sent to the Bangor Wastewater Treatment Plant (WWTP) to comply with the Town’s Interlocal Agreement with the City. Inspections conducted in 2017 included areas expected to be impacted by scheduled and proposed upcoming highway projects, including the Maine Department of Transportation (MDOT), Bangor Area Comprehensive Transportation System (BACTS), and Hampden Water District (HWD) projects as described in Table 1.

**Table 1: Upcoming Project Areas**

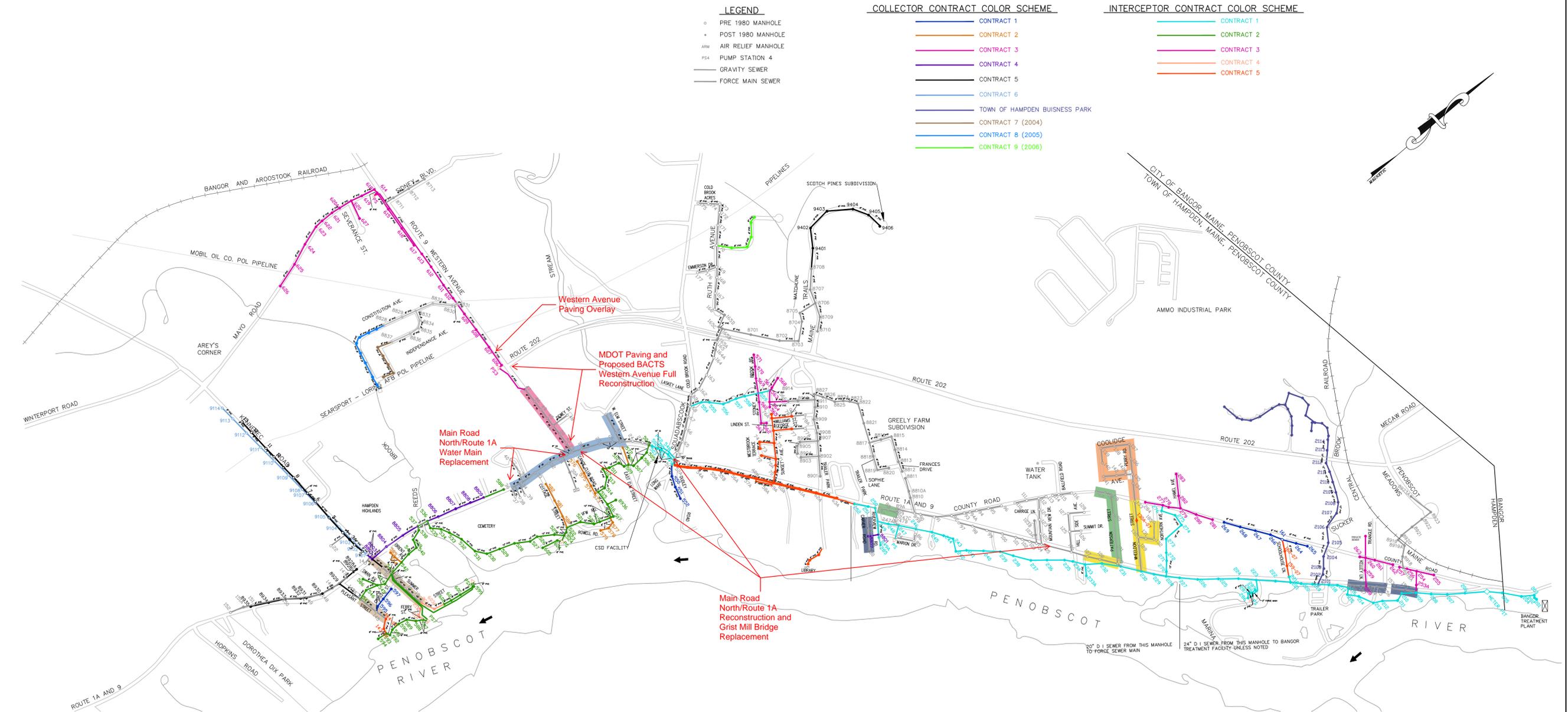
Project Area & Work ID Number (WIN)	Project Scope	Location	Scheduled Year
Main Road North/Rt. 1A WIN 021692.00 & 011577.00	Full Reconstruction and Grist Mill Bridge Replacement	Western Ave north to Mountain View Drive	2018-2019
Western Avenue WIN 023593.00 (MDOT)	MDOT Paving (Mill and Fill)	Main Road North to intersection of Route 202/Hampden Academy	2020
	BACTS Full Reconstruction		Not scheduled Proposed for 2022
Western Avenue WIN 023326.00	Paving (Overlay)	From 0.18 miles west of Chapman Road to Route 202/Hampden Academy intersection	2018
Main Road North/Rt 1A	HWD Water Main Replacement	Western Ave south past Weatherbee School	2018

Woodard & Curran provided sewer infrastructure planning support in 2008, resulting in the identification of seven Sewer Priority Areas based on their condition. These areas were identified as having poor condition sewer and high inflow and infiltration (I/I) rates, resulting in sewer overflows and excessive flow to the Bangor WWTP.



Since 2008, several of the identified projects have been completed, addressing sewer replacement in Priority Areas 1 through 3 and a portion of Priority Area 4. Portions of the remaining Priority Areas are included within the listed project areas and are described further by respective project area. For reference purposes, the 2008 Sewer Priority Area Map has been included as Figure 1.

woodwardcurran.net\shared\Projects\213302 Hampden - Sewer Dept General Engineering Services\SEWER COST ESTIMATES\cad drawings\2007-04-09 Hampden Sewer Locations.dwg, Dec 30, 2015 - 3:03pm



- LEGEND**
- PRE 1980 MANHOLE
  - POST 1980 MANHOLE
  - ARM AIR RELIEF MANHOLE
  - PS4 PUMP STATION 4
  - GRAVITY SEWER
  - FORCE MAIN SEWER

- COLLECTOR CONTRACT COLOR SCHEME**
- CONTRACT 1
  - CONTRACT 2
  - CONTRACT 3
  - CONTRACT 4
  - CONTRACT 5
  - CONTRACT 6
  - TOWN OF HAMPDEN BUSINESS PARK
  - CONTRACT 7 (2004)
  - CONTRACT 8 (2005)
  - CONTRACT 9 (2006)

- INTERCEPTOR CONTRACT COLOR SCHEME**
- CONTRACT 1
  - CONTRACT 2
  - CONTRACT 3
  - CONTRACT 4
  - CONTRACT 5



**Priority Areas 1 through 7  
Town of Hampden  
June 3, 2008**

Description
Priority Area 1
Priority Area 2
Priority Area 3
Priority Area 4
Priority Area 5
Priority Area 6
Priority Area 7

# SEWER PRIORITY AREA MAP



One Merchants Plaza, Suite 501  
Bangor, Maine 04401  
207-945-5105 | www.woodardcurran.com

**WOODARD & CURRAN**

COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE

DESIGNED BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
2007-04-09 Hampden Sewer Locations.dwg

## SEWER PRIORITY AREA MAP

TOWN OF HAMPDEN, MAINE

SEWER COST ESTIMATE

JOB NO.: 213302
DATE: JUNE 2008
SCALE: 1"=1000'
SHEET: OF

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## Inspection Results

### **Route 1A – Reconstruction Project Area**

A large portion of the sewer within this project area has been rehabilitated as part of ongoing CSO control projects and consists of precast manholes with PVC sewer main. In general, the system was in good condition with a few isolated issues such as leaking service lateral taps, pipe sags resulting from backfill settlement, or infiltration at manhole joints.

There was at least one instance of an active high flow from a lateral, indicating that the service pipe may be in poor conditions, a sump pump may have been in use, or a direct foundation or roof drainage connection was present. Further investigation of this service has not been conducted to date.

A section of sewer on Main Road North extending from Old County Road to Mountain View Drive consists of asbestos cement (AC) main and manholes constructed with masonry block. Some significant issues were noted in this section of sewer main, including holes in the pipe, infiltration, roots, and other pipe damage. Many of the manholes showed signs of degradation including missing mortar and brick, frames and risers in poor condition, and poor invert condition.

While this section of AC pipe and manholes was not previously identified as a Sewer Priority Area, the age and condition of the system warrants further consideration for rehabilitation. AC pipe was predominantly installed in the 1950's and 1960's, indicating an asset age exceeding 50 years. Gravity sewer mains are generally predicted to have a useful life of approximately 50 years.

This project is expected to require grade adjustment for each of the 45 sewer manholes in the right-of-way. Additional impacts may result from MDOT drainage system design or alignment impacts. A further review of the MDOT design plans is required for scoping of improvement work, which will be completed separately under the scope of Task Order 16.

The MDOT design plans are currently preliminary and do not have all required existing sewer information incorporated; so, while we have been working with MDOT on design details, we have not been able to perform a complete review. MDOT design plans are expected to be finalized by summer of 2018.

### **Western Avenue – Main Road North to Route 202 Intersection**

The sewer main and manholes along this section of Western Avenue expected to be impacted by the full reconstruction project are some of the oldest in the Hampden system and are in poor condition. Piping consists of vitrified clay pipe (VCP) and manholes are constructed of brick. There are numerous structural pipe failures, holes, and active infiltration throughout this section of sewer main. Several of the manholes also have structural failures with barrel-section fractures, missing brick and mortar, and active infiltration.

Several photos from the sewer inspection are presented to illustrate the deficiencies (see Figures 2 through 4).

Replacement of this section of sewer was identified as Priority Area 5 in previous sewer rehabilitation planning efforts. The Dewey Street sewer main was not inspected and the condition is currently unknown, although it may require rehabilitation as well as it is expected to be of the same installation era.

Figure 2: Example Hole in VCP

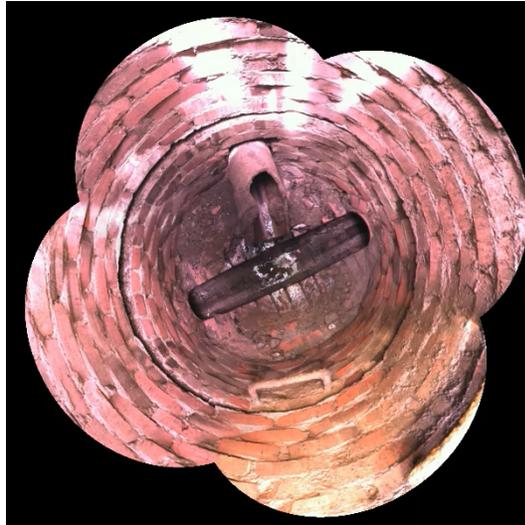


Figure 3: Example VCP Fracture





**Figure 4: Example Manhole Barrel Fracture**



**Western Avenue – Route 202 Intersection to Mayo Road**

The sewer system along this section of Western Avenue appears to have been constructed as part of the Interceptor and Collector Sewers Contract 3 around 1981 and consists of precast concrete manholes and PVC pipe. Piping and manholes were generally in good condition with isolated issues, including infiltration at break-in taps (services installed after installation) and grease deposits. The manhole closest to the Mayo Road Pump Station showed some surface damage, indicating a possible corrosion issue typical of hydrogen sulfide gas formation. Other manholes had poorly-formed inverts resulting from new mains being cut in and one manhole showed evidence of a leaking barrel joint.

**Main Road North – South of Western Avenue Intersection**

The sewer main and manholes along this section of Main Road North is some of the oldest in the Hampden system and in poor condition. Piping consists of vitrified clay pipe (VCP) and manholes are constructed of brick. There are numerous structural pipe failures, holes, root growth, and active infiltration throughout this section of sewer main. Several of the manholes also have structural failures with barrel fractures, missing brick, and active infiltration. Grease deposition has been a known issue in this section of sewer as it serves several restaurants, exacerbated by intruding service laterals and root obstruction. Figures 5 through 7 show examples of these issues from the sewer inspection.

Replacement of this section of sewer was previously identified as part of Priority Area 4 in previous sewer rehabilitation planning efforts. The remainder of Priority Area 4 was replaced in a project completed in 2015.

Figure 5: Example Hole in VCP

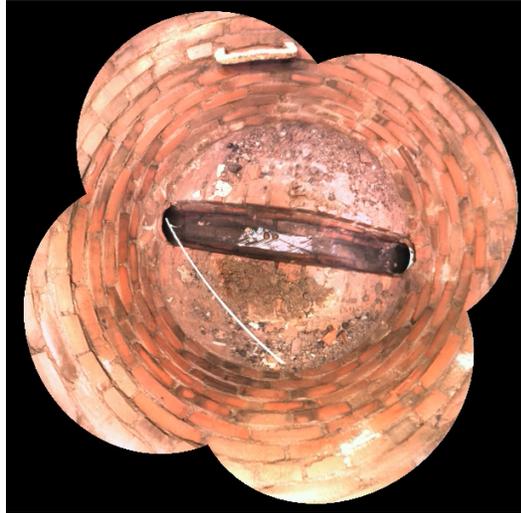


Figure 6: Example Root Intrusion





**Figure 7: Example I/I Evidence of Gravel in Sewer**



## **Improvement Recommendations**

### **Route 1A – Reconstruction Project Area**

The condition of sewer main and manholes was generally in good condition throughout the Route 1A reconstruction project, except for the section of sewer constructed of AC main and barrel-block manholes. There are several significant deficiencies in the AC pipe and in the manhole structures, which are barrel-block construction and exhibited evidence of I/I from damage block and mortar joints. The type and condition of each sewer lateral along this section of AC main is not known, although one appears to be PVC based on the tap connection. There are approximately seven services connected to the approximately 1,800 feet of sewer main within the MDOT project area.

Two barrel-block manholes and approximately 180 feet of AC main are located outside of the MDOT project area.

We recommend the following actions:

- Replacement of all barrel-block manholes within the MDOT project area and replacement and/or rehabilitation of the two barrel-block manholes outside of the MDOT project area.
- Replacement of non-PVC service laterals along the AC main section within the MDOT project area.
- Lining repair of all existing AC main to restore its structural integrity and seal infiltration sources. This can occur after the MDOT project is complete.

A summary cost estimate for these recommendations is provided in Table 2 and a more detailed estimated is included as an attachment.

The full impacts of the scheduled MDOT road reconstruction project have not been evaluated as part of the scope of this report and will be assessed as part of Task Order 16 and presented separately from this report.



### **Western Avenue – Main Road North to Route 202 Intersection**

The condition of sewer along this section of Western Avenue warrants full replacement due to its poor condition.

We recommend the following:

- Replacement of all gravity sewer and service laterals along Western Avenue.
- Replacement of gravity sewer and service laterals on Dewey Street to minimize future disruption.
  - We recommend replacement through open-cut installation within the road right-of-way to occur in advance of or concurrent with the scheduled road rehabilitation project.

For the purposes of this evaluation, we have assumed that the Town will conduct a stand-alone project. However, approaching it as a project concurrent with the road reconstruction project will minimize paving costs on Western Avenue, although the Town will be subject to local cost sharing. A summary total project cost estimate for this Work is provided in Table 2 and a more detailed estimated is included as an attachment.

### **Western Avenue – Route 202 Intersection to Mayo Road**

The sewer system along Western Avenue extending west from the Route 202 intersection does not require significant rehabilitation. Impacts from paving projects (overlay or mill and fill-type projects) are typically minimal and do not require structure replacement or grade adjustment.

We recommend addressing deficiencies noted in the inspections such as replacement of broken manhole covers, reconstruction of manhole inverts for proper drainage, and sealing of manhole joints where infiltration is apparent. We also recommend addressing infiltration occurring at lateral taps by excavating and replacing, injection-grouting, or otherwise repairing the leaking tap connections prior to paving activities along Western Avenue.

No cost estimate is provided for this Work as it does not require significant capital investment.

### **Main Road North – South of Western Avenue Intersection**

The condition of sewer along this section of Western Avenue warrants full replacement due to its poor condition. We recommend replacement through open-cut installation within the road right-of-way.

As this area is scheduled for water main replacement in 2018 by the Hampden Water District, we recommend that the Town coordinate sewer replacement to minimize overall construction impacts. We do not recommend scheduling this work to occur while the MDOT Route 1A reconstruction project is in progress due to the combined impact of construction projects on the Route 1A corridor. Pavement and sidewalk restoration will be required for this project due to the location of the sewer. Coordination water main and sewer replacement

A summary total project cost estimate for this Work is provided in Table 2 and a more detailed estimated is included as an attachment.



## Summary

Summaries of the sewer main and manhole inspection results are included as Attachment 1 and Attachment 2, respectively. This is intended to provide a quick reference to the type of sewer and overall condition until a more comprehensive reporting system is adopted by the Town.

The estimated total project cost for each recommendation, including contingency, engineering, and construction administration services, is provided in Table 2. Detailed estimates are included as Attachments 3 and 4 for each respective project.

**Table 2: Summary Cost Estimate**

Project Area	Estimated Cost
Main Road North/Rt. 1A – Old County Road to Hillside Drive Sewer Rehabilitation	\$442,000 (Partial estimate and does not include all costs associated with Rt. 1A project)
Western Avenue – Main Road North to Route 202 Intersection	\$754,000
Main Road North – South of Western Avenue	\$635,000

We trust the information provided within this letter is useful to the Town for budget planning. We would be happy to continue our work with the Town to prioritize the improvements discussed in this letter and to assist with implementation. If you have any questions or concerns, please don't hesitate to contact me at 207-945-5105 or via email at [kcorbeil@woodardcurran.com](mailto:kcorbeil@woodardcurran.com).

Sincerely,

WOODARD & CURRAN

Kyle Corbeil, P.E.  
Technical Manager

KMC/jeh

cc: Jim Wilson, P.E. – Woodard & Curran

PN: 213302.17

ATTACHMENT 1  
MAIN SUMMARY



CLIENT Town of Hampden  
PROJECT Sanitary Sewer Inspection Review

1 MERCHANTS PLAZA  
SUITE 501  
BANGOR, MAINE 04401  
TEL.(207) 945-5105

DESIGNED BY KMC DATE 1/9/2018  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
PROJECT NO. 0213302.17

Project Area	Upstream MH	Downstream MH	Location	Pipe Material	Pipe Diameter	Pipe Length	Structural					Operations & Maintenance					Sum		Overall Index	Quick Rating	Notes
							1	2	3	4	5	1	2	3	4	5	Structural	O & M			
DOT Rt. 1A Reconstruction and Bridge Replacement 2018/19	MN3008	MN3009	Main Rd N	PolyVinyl Chloride	10	221.4											0	0			No issues
	MN3009	MN3010	Main Rd N	PolyVinyl Chloride	12	259											0	0			No issues
	MN3010	MN3011	Main Rd N	PolyVinyl Chloride	12	241.5											0	0			No issues
	MN3011	MN3012	Main Rd N	PolyVinyl Chloride	12	228.8											0	0			No issues
	MN3012	MN3013	Main Rd N	PolyVinyl Chloride	12	258.9											0	0			No issues
	MN3013	MN3014	Main Rd N	PolyVinyl Chloride	12	251.4											0	0			No issues
	MN3014	MN3015	Main Rd N	PolyVinyl Chloride	12	219.6											0	0			No issues
	MN3015	MN3016	Main Rd N	PolyVinyl Chloride	12	42.4									4		0	4	4.0	4100	Camera underwater
	MN3016	MN3017	Main Rd N	PolyVinyl Chloride	12	95.1											0	0			No issues
	MN3017	MN3018	Main Rd N	PolyVinyl Chloride	12	46.5											0	0			Heavy cleaning required to clear obstruction
	MN3019	MN3020	Main Rd N	PolyVinyl Chloride	8	101.6			2								2	0	2.0	2100	Large joint offset
	MN3020	MN3021	Main Rd N	PolyVinyl Chloride	8	421.6											0	0			No issues
	MN3021	MN3022	Main Rd N	PolyVinyl Chloride	8	347.5			2					2			2	2	2	2200	Sag near MN3021
	MN3023	MN3024	Main Rd N	PolyVinyl Chloride	8	164.9			2								2	0	2	2100	Crack in PVC at 248 ft
	MN3022	MN3023	Main Rd N	PolyVinyl Chloride	8	370.9											0	0			
	MN3024	MN3025	Main Rd N	PolyVinyl Chloride	8	168.8			2					2			2	2			Sag at 161.3 ft
	MN3025	MN3026	Main Rd N	PolyVinyl Chloride	8	341			6					6			6	6	2	2600	Multiple sags, high water
	MN3026	MN3027	Main Rd N	PolyVinyl Chloride	8	357.3			14					14			14	14	2	2A00	Multiple sags, high water
	MN3027	MN3028	Main Rd N	PolyVinyl Chloride	8	175.8			6					6			6	6	2	2600	Multiple sags, pipe indented from backfill
	MN3028	MN3029	Main Rd N	PolyVinyl Chloride	8	174.1											0	0			
	MN3029	MN3030	Main Rd N	PolyVinyl Chloride	8	261.8											0	0			
	MN3030	MN3031	Main Rd N	PolyVinyl Chloride	8	253.5											0	0			
	MN3031	MN3032	Main Rd N	PolyVinyl Chloride	8	254											0	0			
	MN3032	MN3033	Main Rd N	PolyVinyl Chloride	12	37.9											0	0			
	MN3033	MN3034	Main Rd N	PolyVinyl Chloride	12	152.4											0	0			
	MN3034	MN3018	Main Rd N	PolyVinyl Chloride	12	156.2									4		0	4	4	4100	High water level from Sou. PS backwater
	MN3018	SOUPS	Main Rd N	Ductile Iron Pipe	15	75.3									4		0	4	2	2200	Grease deposits
																	0	0			
		MN1001	MN1002	Main Rd N	Asbestos Cement	8	200.8										10	0	5	5200	Holes in pipe at 1.4 ft and 157 ft (concrete filled?)
		MN1002	MN1003	Main Rd N	Asbestos Cement	8	212.2								4		0	4	2	2200	Deposits/gravel/concrete, intruding tap
		MN1003	MN1004	Main Rd N	Asbestos Cement	8	193.6										0	0			Chip in pipe bell
		MN1004	MN1005	Main Rd N	Asbestos Cement	8	200.5										0	0			Patch repair
		MN1005	MN1006	Main Rd N	Asbestos Cement	8	246.7								2	3	5	5	3.3	5131	Holes in pipe, infiltration weeper, roots
		MN1006	MN1007	Main Rd N	Asbestos Cement	8	227.8								4		0	4	2	2200	Roots, chip in pipe bell, small diam. Lateral (2")
	MN1007	MN1008	Main Rd N	Asbestos Cement	8	232.5								2		5	2	3.5	5121	Holes in pipe, infiltration weeper	
	MN1008	MN1009	Main Rd N	Asbestos Cement	8	255.3			2					2		2	2	2	2200	Surface spalling	
	MN2001	MN2002	Main Rd N	PolyVinyl Chloride	8	169.2										0	0				
	MN2002	MN2003	Main Rd N	PolyVinyl Chloride	8	256.4										0	0				
	OC1000	MN2004	Old County Rd	Polyethylene	8	251.7								4	8	0	12			Infiltration runner, defective breakin tap, high water level	
	MN2004	MN2005	Main Rd N	PolyVinyl Chloride	8	303.9										0	0				
	MN2005	MN2006	Main Rd N	PolyVinyl Chloride	8	177.1										0	0				
	MN2006	MN2003	Main Rd N	PolyVinyl Chloride	8	197.9										0	0				

**ATTACHMENT 1  
MAIN SUMMARY**

Project Area	Upstream MH	Downstream MH	Location	Pipe Material	Pipe Diameter	Pipe Length	Structural					Operations & Maintenance					Sum		Overall Index	Quick Rating	Notes	
							1	2	3	4	5	1	2	3	4	5	Structural	O & M				
DOT Rt. 1A Paving Project Main Road North South of Western Ave	MN3002	MN3003	Main Rd N	Vitrified Clay Pipe	8	244.2		2					20	6			2	26	2.2	322A	Several infiltration weepers, roots	
	MN3001	MN3002	Main Rd N	Vitrified Clay Pipe	8	255.2	1		12		10		1		12	4		23	17	3.1	5241	Pipe fracture, holes in pipe, roots
	MN3003	MN3004	Main Rd N	Vitrified Clay Pipe	8	262.5		8					6	16	39	4		8	65	2.3	413A	Numerous infiltration points and roots
	MN3004	MN3005	Main Rd N	PolyVinyl Chloride	8	288.1		2						2				2	2	2	2200	Sag
	MN3005	MN3006	Main Rd N	Vitrified Clay Pipe	8	42.3								26				0	26	2	2A00	Intruding services, numerous infiltration weepers
	MN3006	MN3007	Main Rd N	Vitrified Clay Pipe	8	221			6					18				6	18	2	2A00	Grease-coated lateral, attached deposits, sags
	MN3007	MN3008	Main Rd N	PolyVinyl Chloride	10	31.1												0	0			
DOT Western Ave Sidewalk Construction and Paving Project	WS1001	WS1002	Western Ave	PolyVinyl Chloride	8	420.3											0	0				
	WS1002	WS1003	Western Ave	PolyVinyl Chloride	8	423.6											0	0				
	WS1003	WS1004	Western Ave	PolyVinyl Chloride	8	382.4											0	0				
	MAY011	WS1004	Western Ave	PolyVinyl Chloride	8	67.6											0	0				
	WES001	WES002	Western Ave	PolyVinyl Chloride	8	303											0	0				
	WES002	WES003	Western Ave	PolyVinyl Chloride	8	395.8											0	0				
	WES003	WES004	Western Ave	PolyVinyl Chloride	8	298.8											0	0				
	WES004	WES005	Western Ave	PolyVinyl Chloride	8	194.5											0	0				
	WES005	WES006	Western Ave	PolyVinyl Chloride	8	173.9											0	0				
	WES006	WES007	Western Ave	PolyVinyl Chloride	8	374.3										4		0	4	4	4100	Infiltration runner at break in tap at 281 ft
WES007	WES008	Western Ave	PolyVinyl Chloride	8	243.9								2				0	2	2	2100	Infiltration weeper at break in tap at 32 ft	
WES008	WES009	Western Ave	PolyVinyl Chloride	8	167												0	0				
WES009	WES010	Western Ave	PolyVinyl Chloride	8	396.4								2				0	2	2	2100	Grease deposits	
BACTS Western Ave Reconstruction	WES011	WES012	Western Ave	Vitrified Clay Pipe	8	220.9		4	15	8	15		4				42	4	3.3	5342	Multiple pipe fractures, infiltration weepers, holes in pipe	
	WES012	WES013	Western Ave	Vitrified Clay Pipe	8	220			33	4	15		6				52	6	3.2	5341	Multiple pipe fractures, infiltration weepers, holes in pipe	
	WES013	WES014	Western Ave	Vitrified Clay Pipe	8	152.8			18		5		12				23	12	2.7	5136	Pipe cracks and fractures, large holes in pipe, lateral full of debris	
	WES014	WES015	Western Ave	Vitrified Clay Pipe	8	250.7	1	2	30	4	35		6				72	6	3.3	5741	Pipe cracks and fractures, multiple holes in pipe	
	WES015	WES016	Western Ave	Vitrified Clay Pipe	10	43.5			3	4			2				7	2	3	4131	Pipe fracture, obstacle in pipe (repaired)	
	WES016	WES017	Western Ave	Vitrified Clay Pipe	10	231.1		10	36	8	50		10				104	10	3.3	5A42	Pipe cracks and fractures, multiple holes in pipe	
	WES017	MN3007	Western Ave	Vitrified Clay Pipe	10	245.2			24	8	55		2				87	2	3.8	5A42	Pipe cracks and fractures, multiple holes in pipe	
No Project	MN1009	MN1010	Main Rd N	Asbestos Cement	8	160.1					5		4				5	4	3	5122	Hole in pipe, concrete deposits, infiltration	
	MN1010	MN1011	Main Rd N	Asbestos Cement	8	18.9	2										2	0	1	1200	Joint offset at AC/PVC connection, 22 elbows	
	MN1011	MN1012	Main Rd N	PolyVinyl Chloride	8	214.4											0	0				
	MN1012	MN1013	Main Rd N	PolyVinyl Chloride	8	335.9												0	0			
	MN1013	MN1014	Main Rd N	PolyVinyl Chloride	8	287.2		2						2				2	2			Sag
	MN1014	MN1015	Main Rd N	PolyVinyl Chloride	8	329.4												0	0			
	MN1016	MN1015	Main Rd N	PolyVinyl Chloride	8	368.3												0	0			Backfill indent on pipe
	MN1016	INT000	Main Rd N	PolyVinyl Chloride	8	55.4	1										1	0	1	1100	Joint partially separated at Fernco, outside drop	
	INT100	INT101	Main Rd N	Ductile Iron Pipe	21	254.8								12				0	12	2.9	3026	
INT101	INT102	Main Rd N	Ductile Iron Pipe	21	195								6				0	6	2.9	3F23	Surface corrosion, infiltration weeper	

**ATTACHMENT 2  
MANHOLE SUMMARY**



CLIENT Town of Hampden  
PROJECT Sanitary Sewer Inspection Review

1 MERCHANTS PLAZA  
SUITE 501  
BANGOR, MAINE 04401  
TEL.(207) 945-5105

DESIGNED BY KMC DATE 01/09/2018  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
PROJECT NO. 0213302.17

Project Area	Manhole Number	Location	In Pavement	Grade to Invert Depth (ft)	Structural Rating					Operations & Maintenance Rating					Sum		Manhole Rating	LoF	Condition Notes			
					1	2	3	4	5	1	2	3	4	5	Structural	O & M				Overall		
DOT Rt. 1A Reconstruction and Bridge Replacement 2018/19	MN3008	Main Road North at Western Ave	Yes	9.7	3						7					3	7	10	1.0	2.0	Precast, installed in 2014, infiltration stain at joint	
	MN3009	Main Road North	Yes	8.33	3						5	2				3	7	10	1.1	2.1	Precast, installed in 2014, infiltration weeper at grade ring joint	
	MN3010	Main Road North	Yes	10.17	3						6					3	6	9	1.0	1.9	Precast, installed in 2014, infiltration stain at joint	
	MN3011	Main Road North	Yes	7.58	3						6					3	6	9	1.0	1.9	Precast, installed in 2014, infiltration stain at joint	
	MN3012	Main Road North at Elm Street	Yes	7.83	3						7					3	7	10	1.0	2.0	Precast, installed in 2014	
	MN3013	Main Road North	No	5.5	3						8					3	8	11	1.0	2.0	Precast, installed in 2014	
	MN3014	Main Road North	No	4.25	3						6					3	6	9	1.0	1.9	Precast, installed in 2014	
	MN3015	Main Road North at CSO PS	No	7.41	3						7					3	7	10	1.0	2.0	Precast with inlet from 12" Interceptor and CSO PS	
	MN3016	Main Road North at CSO PS	No	5.5	3						6					3	6	9	1.0	1.9	Precast with inlet from CSO tank overflow	
	MN3017	Main Road North	No	3.83	3						6					3	6	9	1.0	1.9	Precast	
	MN3018	Main Road North at Sou. PS	No	4.91	3						6					3	6	9	1.0	1.9	Precast, inlet to Sou. PS	
	MN3019	Main Road North																				Not inspected
	MN3020	Main Road North	No	8.17	3						6					3	6	9	1.0	1.9	Precast, installed in 2006	
	MN3021	Main Road North	No	7.08	3						6					3	6	9	1.0	1.9	Precast, installed in 2006	
	MN3022	Main Road North	Yes	7.91	3						6					3	6	9	1.0	1.9	Precast, installed in 2006	
	MN3023	Main Road North	No	7.08	3	4					5					7	5	12	1.2	2.2	Precast, installed in 2006, cracked barrel section	
	MN3024	Main Road North at _____	No	8.17	3						8					3	8	11	1.0	2.0	Precast, installed in 2006	
	MN3025	Main Road North	Yes	10.33	3						5					3	5	8	1.0	1.8	Precast, installed in 2006	
	MN3026	Main Road North	Yes	12	3						5					3	5	8	1.0	1.8	Precast, installed in 2006	
	MN3027	Main Road North	Yes	9.75	3						5					3	5	8	1.0	1.8	Precast, installed in 2006	
	MN3028	Main Road North	No	8.42	3						5					3	5	8	1.0	1.8	Precast, installed in 2006	
	MN3029	Main Road North	Yes	8.17	3						6					3	6	9	1.0	1.9	Precast, installed in 2006, misaligned inlet/channel	
	MN3030	Main Road North	Yes	7.83	3						5					3	5	8	1.0	1.8	Precast, installed in 2006	
	MN3031	Main Road North	Yes	7.17	3						5					3	5	8	1.0	1.8	Precast, installed in 2006	
	MN3032	Main Road North	No	7	3						6					3	6	9	1.0	1.9	Precast, installed in 2006	
	MN3033	Main Road North	No	10	3						7					3	7	10	1.0	2.0	Precast, installed in 2006, 4 way 12"	
	MN3034	Main Road North	No	3.17	3		3				6					6	6	12	1.2	3.1	Precast, installed in 2006, frame offset	
	MN1001	Main Road North at Old County Road	No													0	0	0				Not inspected
	MN1002	Main Road North	No	6.9	3		3				6					6	6	12	1.2	3.1		Barrel block, small break in pipe invert opening
	MN1003	Main Road North	No	6	3						6					3	6	9	1.0	1.9		Barrel block, poor invert condition
	MN1004	Main Road North	No	5.5	3		3				6					6	6	12	1.2	3.1		Barrel block, missing mortar, poor invert condition
	MN1005	Main Road North	No	6	4		3	4			6					11	6	17	1.4	4.1		Offset frame, barrel block, missing mortar, poor invert condition
	MN1006	Main Road North	No	6	3						6					3	6	9	1.0	1.9		Barrel block, missing mortar, break in pipe invert
	MN1007	Main Road North	No	6.3	3		3				6					6	6	12	1.2	3.1		Barrel block, missing mortar, break in pipe invert
MN1008	Main Road North at Carriage Lane	No	7.58	4			4			7	2				8	9	17	1.3	4.1		Barrel block, missing mortar, break in pipe invert	
MN2001	Main Road North	No	5.67	3						5					3	5	8	1.0	1.8		Precast	
MN2002	Main Road North	Yes	6.67	3						6					3	6	9	1.0	1.9		Precast	
MN2003	Main Road North	Yes	6.75	3						7	2		5		3	14	17	1.4	5.1		Precast, leaking insert cover	
MN2004	Main Road North	No	6.9	3						6					3	6	9	1.0	1.9		Precast	
MN2005	Main Road North	No	6	3						7					3	7	10	1.0	2.0		Precast, debris on shelf and in invert from 4" lateral	
MN2006	Main Road North at Frances Drive	No	7.4	3						6					3	6	9	1.0	1.9		Precast, roots from bottom joint, poorly formed invert from Frances Drive	
OC1000	Old County Road	Yes	5.08	3					5	6					8	6	14	1.4	5.1		Precast, installed in 2015, frame offset	

**ATTACHMENT 2  
MANHOLE SUMMARY**

Project Area	Manhole Number	Location	In Pavement	Grade to Invert Depth (ft)	Structural Rating					Operations & Maintenance Rating					Sum	Overall	Manhole Rating	LoF	Condition Notes					
					1	2	3	4	5	1	2	3	4	5						Structural	O & M			
DOT Rt. 1A Paving Project Main Road North, South of Western Ave	MN3001	Main Road North																Not inspected						
	MN3002	Main Road North	Yes	7.67	3				4					6		7	6	13	1.3	4.1	Brick manhole, fractured grade ring			
	MN3003	Main Road North at Weatherbee School	Yes	9.75	3									6	4			3	10	13	1.2	2.2	Brick manhole, infiltration weepers, gravel deposits on bench, lateral inlet without drop	
	MN3004	Main Road North	Yes	7.33	3			3						6	2			6	8	14	1.3	3.1	Brick manhole, displaced brick in grade ring, gravel deposits on bench	
	MN3005	Main Road North	Yes	6.9	3									6				3	6	9	1.0	1.9	Brick manhole, gravel deposits on bench	
	MN3006	Main Road North	Yes	8.17	3									7	2			3	9	12	1.1	2.1	Brick manhole, infiltration weeper at joint, 4" lateral without drop pipe	
	MN3007	Main Road North																					Not inspected	
MDOT Western Ave Sidewalk Construction and Paving Project	MAY011	Western Ave at Mayo Road	No	8.4	3	4								5				7	5	12	1.2	2.2	Precast, surface damage to concrete barrel sections, possible H2S issue	
	WS1001	Western Ave	No	6	3									7				3	7	10	1.0	2.0	Precast, Mayo PS discharge, may be mislabeled, should be WES1001?	
	WS1002	Western Ave	No	8.08	3									6				3	6	9	1.0	1.9	Precast, Two unsupported pipe drop laterals	
	WS1003	Western Ave	No	7.41	2									7	2			2	9	11	1.1	2.1	Precast	
	WS1004	Western Ave	Yes	10.75	3									7				3	7	10	1.0	2.0	Precast	
	WES1001	Western Ave	No	4.5	3									6				3	6	9	1.0	1.9	Precast	
	WES1002	Western Ave	No	6.17	2				4					6	2			6	8	14	1.4	4.1	Precast. Broken cover	
	WES1003	Western Ave	Yes	7.5	1			3						6	2	3		4	11	15	1.5	3.2	Break in pipe invert, invert/bench modified	
	WES1004	Western Ave	No	6.83	3									6				3	6	9	1.0	1.9	Precast	
	WES1005	Western Ave	No	5.83	3									7				3	7	10	1.0	2.0	Precast, incorrectly labeled pipe sizes???	
	WES1006																	0	0	0				Not inspected
	WES1007																	0	0	0				Not inspected
	WES1008	Western Ave	No	6.58	3									6	2			3	8	11	1.1	2.1	Precast, infiltration weeper at joint, cut in invert	
WES1009	Western Ave	No	11.75	3									7				3	7	10	1.0	2.0	Precast, unusual invert		
WES1010																							Not inspected	
BACTS Western Ave Reconstruction	WES1011	Western Ave	Yes	6	3			3						7				6	7	13	1.2	3.1	Brick manhole, issue with chimney	
	WES1012	Western Ave	Yes	6.33	3	8								7				11	7	18	1.3	2.4	Brick manhole, cracks in barrel, infiltration stain	
	WES1013	Western Ave	Yes	7.41	3									6				3	6	9	1.0	1.9	Brick manhole	
	WES1014	Western Ave	Yes	6.75	3									5				3	5	8	1.0	1.8	Brick manhole	
	WES1015	Western Ave at Dewey St	Yes	7.91	3			6						5		3		9	8	17	1.5	3.3	Brick manhole, large fractures in wall, missing brick, unusual invert in from Dewey	
	WES1016	Western Ave																						Not inspected
	WES1017	Western Ave	Yes	7.83	3			6						7				9	7	16	1.3	3.2	Brick manhole, large fractures in wall, missing brick	
	WES1017A	Western Ave at Main Road North	Yes	7.33	3									6				3	6	9	1.0	1.9	Brick manhole	
No project	MN1009	Main Road North	No	7	3									7				3	7	10	1.0	2.0	Concrete riser cone over barrel block, break in pipe invert	
	MN1010	Main Road North at Mountain View Drive	No	7.08	4			3						6	4			7	10	17	1.3	3.1	Barrel block, missing mortar, break in pipe invert, poor invert condition, infiltration weeper	
	MN1011	Main Road North	Yes	7.4	3									7				3	7	10	1.0	2.0	Precast, installed in 2009	
	MN1012	Main Road North at Hillside Drive	Yes	8.4	3									6				3	6	9	1.0	1.9	Precast, installed in 2009	
	MN1013	Main Road North	Yes	7.4	3									6				3	6	9	1.0	1.9	Precast, installed in 2009	
	MN1014	Main Road North	Yes	7.4	3									6				3	6	9	1.0	1.9	Precast, installed in 2009	
	MN1015	Main Road North	Yes	7.17	3									6				3	6	9	1.0	1.9	Precast, installed in 2009	
	MN1016	Main Road North at Patterson Street	Yes	7.75	3									7				3	7	10	1.0	2.0	Precast, installed in 2009	
No Project	INT000	Main Road North at Patterson St.	No	16.5	3									8				3	8	11	1.0	2.0	Precast	
	INT100	Main Road North	No	5.4	3									5				3	5	8	1.0	1.8	Precast	
	INT101	Main Road North	Yes	9.08	3									6				3	6	9	1.0	1.9	Precast	
	INT102	Main Road North	Yes	10	3									6				3	6	9	1.0	1.9	Precast	



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**TOWN OF HAMPDEN - SANITARY SEWER REPLACEMENT**

**ATTACHMENT 3**

**WESTERN AVE - BACTS RECONSTRUCTION PROJECT**

**OPINION OF PROBABLE COST**

January 2018

Bid Item	Description	Unit	Estimated Quantity	Unit Price	Value
<b>OPINION OF PROBABLE COST</b>					
1	Administration	LS	1	\$ 28,000	\$ 28,000
2	Excavation of Unsuitable Materials	CY	50 *	\$ 50	\$ 2,500
3	Select Backfill	CY	50 *	\$ 50	\$ 2,500
4	Rock Excavation	CY	50 *	\$ 200	\$ 10,000
5	Pavement Repair - Town Roads, Driveways & Sidewalks	SY	700	\$ 80	\$ 56,000
6	Pavement Repair - State Roads, Driveways & Sidewalks	SY	1,300	\$ 120	\$ 156,000
7	Open Cut Main Replacement - Western Avenue	LF	1,370	\$ 150	\$ 205,500
8	Open Cut Main Replacement - Dewey Street	LF	400	\$ 150	\$ 60,000
9	Four Foot Diameter Pre-Cast Manhole - Western Avenue	EA	8	\$ 6,000	\$ 48,000
10	Four Foot Diameter Pre-Cast Manhole - Dewey Street	EA	1	\$ 6,000	\$ 6,000
<b>Total Estimated project cost</b>					<b>\$580,000</b>
<b>15% Contingency</b>					<b>\$87,000</b>
<b>15% Admin, Engineering &amp; Construction Admin Services</b>					<b>\$87,000</b>
<b>Total + Contingency</b>					<b>\$754,000</b>



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**TOWN OF HAMPDEN - SANITARY SEWER REPLACEMENT**

**ATTACHMENT 4**

**MAIN ROAD NORTH - SOUTH OF WESTERN AVE (REMAINING PORTION OF PRIORITY AREA #4)**

**OPINION OF PROBABLE COST**

January 2018

Bid Item	Description	Unit	Estimated Quantity	Unit Price	Value
<b>OPINION OF PROBABLE COST</b>					
1	Administration	LS	1	\$ 24,000	\$ 24,000
2	Excavation of Unsuitable Materials	CY	50 *	\$ 50	\$ 2,500
3	Select Backfill	CY	50 *	\$ 50	\$ 2,500
4	Rock Excavation	CY	50 *	\$ 200	\$ 10,000
5	Pavement Repair - Town Roads, Driveways & Sidewalks	SY	200	\$ 80	\$ 16,000
6	Pavement Repair - State Roads, Driveways & Sidewalks	SY	1,500	\$ 120	\$ 180,000
7	Asphalt Curb	LF	960	\$ 12	\$ 11,600
8	Open Cut Main Replacement	LF	1,320	\$ 150	\$ 198,000
9	Four Foot Diameter Pre-Cast Manhole	EA	7	\$ 6,000	\$ 42,000
<b>Total Estimated project cost</b>					<b>\$487,000</b>
<b>15% Contingency</b>					<b>\$74,000</b>
<b>15% Admin, Engineering &amp; Construction Services</b>					<b>\$74,000</b>
<b>Total + Contingency</b>					<b>\$635,000</b>

\* Indeterminate Quantity



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DRIVE RESULTS**

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**TOWN OF HAMPDEN - SANITARY SEWER REPLACEMENT**

**ATTACHMENT 5**

**MAIN ROAD NORTH - MDOT ROUTE 1A RECONSTRUCTION PROJECT**

**OPINION OF PROBABLE COST**

January 2018

Bid Item	Description	Unit	Estimated Quantity	Unit Price	Value
<b>OPINION OF PROBABLE COST</b>					
1	Administration	LS	1	\$ 31,000	\$ 31,000
2	Excavation of Unsuitable Materials	CY	50 *	\$ 50	\$ 3,000
3	Select Backfill	CY	50 *	\$ 50	\$ 3,000
4	Rock Excavation	CY	50 *	\$ 200	\$ 10,000
5	Pavement Repair - Town Roads, Driveways & Sidewalks	SY	200	\$ 80	\$ 16,000
6	Pavement Repair - State Roads, Driveways & Sidewalks	SY	100	\$ 120	\$ 12,000
7	Open Cut Main Replacement	LF	20	\$ 150	\$ 3,000
8	Trenchless Main Replacement	LF	1,950	\$ 90	\$ 176,000
9	Four Foot Diameter Pre-Cast Manhole	EA	10	\$ 6,000	\$ 60,000
10	Manhole grade adjustment	EA	30	\$ 800	\$ 24,000
<b>Total Estimated project cost</b>					<b>\$340,000</b>
<b>15% Contingency</b>					<b>\$51,000</b>
<b>15% Admin, Engineering &amp; Construction Services</b>					<b>\$51,000</b>
<b>Total + Contingency</b>					<b>\$442,000</b>