

North Kent Sewer Authority, July 2010 SRF Project Plan

Energy Efficiency Business Case for Phase I Forest Ridge Wastewater Pumping Station

The project goals for the modification to the Forest Ridge wastewater pumping station are the following:

- Increase energy efficiency of the existing pumping station by approximately 70 percent.
- Increase reliability of the existing cast iron force main.

The primary goal of the proposed improvements is increased energy efficiency.

The Forest Ridge Lift Station serves a large portion of Plainfield Township. The lift station currently pumps to the Southerly Trunk sewer which then flows to the Four Mile Lift Station. The proposed scope of work is to construct a force main and gravity sewer that will transport wastewater from the Forest Ridge Lift Station to the existing North Kent Sewer Authority PARCC Side Clean Water Plant and greatly reduce the amount of static lift and pipe friction loss experienced by the pumps.

A gravity sewer flow that currently comes down Jupiter Avenue to the Forest Ridge Lift Station will also be intercepted to eliminate unnecessary pumping of wastewater. The current gravity sewer will remain in place for emergency purposes and provide redundancy and operational flexibility.

FOREST RIDGE LIFT STATION MODIFICATIONS

A new 12-inch ductile iron force main is proposed to replace a portion of the existing 16-inch cast iron force main on Forest Ridge Avenue from the lift station to Colt Avenue. The existing 16-inch cast iron force main continues south from the Forest Ridge approximately 1,100 lineal feet to Airway Drive where it terminates in a gravity sewer. The existing 16-inch cast iron force

main has catastrophically failed on two prior occasions. The newly constructed force main will terminate at a proposed 24-inch diameter gravity sewer constructed from the Forest Ridge Avenue and Coit intersection westerly to the existing North Kent Sewer Authority PARCC Side Clean Water Plant. The construction of the new gravity sewer will reduce the total dynamic head by 103 feet and bypass 1,100 feet of the existing cast iron force main. The new gravity sewer will also intercept approximately 160,000 gallons per day reducing the amount of wastewater pumped by the station daily. ←

The existing pumps and impellers at the lift station are to remain in use by modifying the existing controls. In 2004 the existing pump motors were replaced with ultra high efficiency motors. The current station is equipped with variable frequency drives and will optimize the system to operate at the most efficient zone during different pumping demands.

Currently the Township uses approximately 128,500 kilowatt-hours of energy per year at the Forest Ridge pumping station and pumps approximately 460,000 gallons per day. The proposed improvements will redirect approximately 160,000 gallons per day from the Forest Ridge pumping station and reduce the total dynamic head by approximately 103 feet. With the reduction in flow and decreased total dynamic head, Plainfield Township is expected to increase the overall efficiency of the pumping station by 70 percent or save 90,400 kilowatt-hours of energy per year.

The design life of the improvements is approximately 30 years. Currently the Township is paying approximately \$0.08 per kilowatt-hour. Over the design life the realized savings is expected to be at least \$217,000. This assumes no increase in the cost of energy paid by Plainfield Township. One could easily expect the cost of energy to increase significantly over

the next 30 years therefore the expected savings is expected to be higher than the 70 percent stated above.

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Final

Bid Tabulation

Item No.		Description	Quantity	Unit	Unit Price	Total Amount	Eligible	Non-Eligible	Eligible	Non-Eligible
					Kammiriga & Roodvoets 3435 Broadmoor Ave SE Grand Rapids, MI 49512		SRF Loan Costs		Green Project Reserve	
					Project #: 2080762					
					June 28, 2011 at 10:00 a.m.					
Owner: North Kent Sewer Authority, Kent County, Michigan										
Project Title: Plainfield Charter Township Wastewater System Improvements, Coit Avenue and Forest Ridge Avenue - Contract No. 1										
1		Tree Clearing	11 s.		\$8,810.00	\$8,810.00	\$8,810.00	\$0.00	\$8,810.00	\$0.00
2		Pavement Removal - Coit Avenue Southerly Half	3,570 l.f.		\$1.50	\$5,355.00	\$5,355.00	\$0.00	\$5,355.00	\$0.00
3		Pavement Removal - Coit Avenue, Northerly Half (Non-Eligible)	6,550 s.y.		\$0.80	\$5,240.00	\$0.00	\$5,240.00	\$0.00	\$0.00
4		Pavement Removal - Forest Ridge Avenue	400 l.f.		\$3.00	\$1,200.00	\$1,200.00	\$0.00	\$1,200.00	\$0.00
5		Remove 16" Forcemain	710 l.f.		\$7.50	\$5,325.00	\$5,325.00	\$0.00	\$4,710.00	\$615.00
6		Abandon 16" Forcemain with Flowable Fill	600 l.f.		\$6.50	\$3,900.00	\$3,900.00	\$0.00	\$3,900.00	\$0.00
7		Remove 12" Culvert	70 l.f.		\$8.00	\$560.00	\$560.00	\$0.00	\$560.00	\$0.00
Section A Subtotal:						\$30,390.00	\$25,150.00	\$5,240.00	\$24,535.00	\$615.00
Section B: Sanitary Sewer Construction										
1		24" Sanitary Sewer	2,630 l.f.		\$71.50	\$188,045.00	\$188,045.00	\$0.00	\$188,045.00	\$0.00
2		12" Sanitary Sewer	1,030 l.f.		\$38.00	\$39,140.00	\$39,140.00	\$0.00	\$39,140.00	\$0.00
3		6" Sanitary Sewer Lateral, Complete	60 l.f.		\$30.00	\$1,800.00	\$1,800.00	\$0.00	\$1,800.00	\$0.00

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4	12"x12"x6" Wye	3 ea.		\$275.00	\$825.00	\$825.00	\$0.00	\$825.00	\$0.00
5	4' Diameter Polymer Concrete Manhole	6 ea.		\$10,000.00	\$60,000.00	\$60,000.00	\$0.00	\$60,000.00	\$0.00
6	5' Diameter Polymer Concrete Manhole	1 ea.		\$14,000.00	\$14,000.00	\$14,000.00	\$0.00	\$14,000.00	\$0.00
7	Core & Boot Existing Polymer Concrete Manhole	1 ea.		\$600.00	\$600.00	\$600.00	\$0.00	\$600.00	\$0.00
8	4' Diameter Concrete Manhole	2 ea.		\$2,400.00	\$4,800.00	\$4,800.00	\$0.00	\$4,800.00	\$0.00
9	6x4' Concrete Diversion Chamber	1 l.s.		\$15,000.00	\$15,000.00	\$15,000.00	\$0.00	\$15,000.00	\$0.00
Section B Subtotal:					\$324,210.00	\$324,210.00	\$0.00	\$324,210.00	\$0.00
Section C: Force Main Construction									
1	Connect to Existing D.I. 16" Force Main w/ Sleeve	2 ea.		\$1,000.00	\$2,000.00	\$2,000.00	\$0.00	\$1,000.00	\$1,000.00
2	16" Forcemain	540 l.f.		\$100.00	\$54,000.00	\$54,000.00	\$0.00	\$0.00	\$54,000.00
3	16" Restrained Joint Forcemain	100 l.f.		\$120.00	\$12,000.00	\$12,000.00	\$0.00	\$0.00	\$12,000.00
4	12" Restrained Joint Forcemain	700 l.f.		\$85.00	\$59,500.00	\$59,500.00	\$0.00	\$59,500.00	\$0.00

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5	12" Sleeve	1 ea.		\$1,000.00	\$1,000.00	\$1,000.00	\$0.00	\$1,000.00	\$0.00		
6	12" Valve & Box	2 ea.		\$2,200.00	\$4,400.00	\$4,400.00	\$0.00	\$4,400.00	\$0.00		
7	12"x12"x12" Wye	1 ea.		\$1,400.00	\$1,400.00	\$1,400.00	\$0.00	\$1,400.00	\$0.00		
8	16" 45° Bend	2 ea.		\$1,100.00	\$2,200.00	\$2,200.00	\$0.00	\$0.00	\$2,200.00		
9	12" 90° Bend	1 ea.		\$725.00	\$725.00	\$725.00	\$0.00	\$725.00	\$0.00		
10	16"x12" Reducer	2 ea.		\$850.00	\$1,700.00	\$1,700.00	\$0.00	\$1,700.00	\$0.00		
11	Bypass Pumping	1 l.s.		\$7,500.00	\$7,500.00	\$7,500.00	\$0.00	\$7,500.00	\$0.00		
Section C Subtotal:				\$146,425.00	\$146,425.00	\$146,425.00	\$0.00	\$77,225.00	\$69,200.00		

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Section D: Restoration & Miscellaneous									
1	Remove & Replace 18" Culvert	20	l.f.	\$45.00	\$900.00	\$900.00	\$0.00	\$900.00	\$0.00
2	Remove & Replace 15" Storm Sewer/Culvert	30	l.f.	\$43.00	\$1,290.00	\$1,290.00	\$0.00	\$1,290.00	\$0.00
3	Remove & Replace 12" Storm Sewer/Culvert	110	l.f.	\$42.00	\$4,620.00	\$4,620.00	\$0.00	\$4,620.00	\$0.00
4	Place 15" Concrete Culvert	70	l.f.	\$50.00	\$3,500.00	\$3,500.00	\$0.00	\$3,500.00	\$0.00
5	Brace Power Pole	1	ea.	\$200.00	\$200.00	\$200.00	\$0.00	\$200.00	\$0.00
6	Coit Avenue Road Replacement	3,550	l.f.	\$49.50	\$175,725.00	\$175,725.00	\$0.00	\$175,725.00	\$0.00
7	Coit Avenue, Northerly Half, HMA - 3C (Non-Eligible)	1,200	ton	\$64.00	\$76,800.00	\$0.00	\$76,800.00	\$0.00	\$0.00
8	Coit Avenue, Northerly Half, HMA - 4C (Non-Eligible)	800	ton	\$68.50	\$54,800.00	\$0.00	\$54,800.00	\$0.00	\$0.00
9	Forest Ridge Road Replacement	185	l.f.	\$49.50	\$9,157.50	\$9,157.50	\$0.00	\$9,157.50	\$0.00
10	Remove & Replace HMA Drive	50	l.f.	\$58.00	\$2,900.00	\$2,900.00	\$0.00	\$2,900.00	\$0.00
11	Remove & Replace Gravel Drive	250	l.f.	\$16.00	\$4,000.00	\$4,000.00	\$0.00	\$4,000.00	\$0.00

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12	Remove & Replace Concrete Curb & Gutter	65	l.f.	\$30.00	\$1,950.00	\$1,950.00	\$0.00	\$1,950.00	\$0.00
13	Topsoil, Seed, Fertilizer & Mulch (or Straw Matting)	900	l.f.	\$5.00	\$4,500.00	\$4,500.00	\$0.00	\$4,500.00	\$0.00
14	Traffic Control & Maintenance	1	l. sum	\$12,000.00	\$12,000.00	\$12,000.00	\$0.00	\$12,000.00	\$0.00
15	Soil Erosion & Sedimentation Control	1	l. sum	\$7,300.00	\$7,300.00	\$7,300.00	\$0.00	\$7,300.00	\$0.00
16	Forest Ridge Lift Station Control Modifications	1	l.s.	\$5,000.00	\$5,000.00	\$5,000.00	\$0.00	\$5,000.00	\$0.00
Section D Subtotal:					\$364,642.50	\$233,042.50	\$131,600.00	\$233,042.50	\$0.00
Totals					\$865,667.50	\$728,827.50	\$136,840.00	\$659,012.50	\$69,815.00
Green Project Reserve Percent Eligible vs Non-Eligible									89.4%