

MICHIGAN DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT

INTEROFFICE COMMUNICATION

TO: File *JK*
FROM: Izabel Hartman
DATE: August 9, 2011
SUBJECT: State Revolving Fund Project No. 5392-01
Southgate-Wyandotte Relief Drains Drainage District (RTF S-O)
Green Project Reserve (GPR) Funding Cost Calculation

The purpose of this memo is to document the cost calculations for the green reserve funding for the Southgate-Wyandotte Relief Drains Drainage District Retention Treatment Facilities (RTF) Sequenced Operations (S-O), SRF Project No. 5392-01. Currently, the facility operates in parallel operation (P-O), where all the flow is pumped to both basins simultaneously, so all the flow is disinfected, including all of the smaller events that will not overflow from the basin. Under the new S-O, only one (of the two) basins will be on-line and filled with first flush flow prior to opening the second basin and isolating the first. This system will allow the facility to significantly reduce the use of sodium hypochlorite disinfectant while saving more than 25-percent of the disinfection electrical energy. Chemical by-products that occur as a result of the disinfection process will be reduced as well.

The total loan amount is \$2,570,000. The entire project qualifies as green; therefore, the entire loan amount qualifies for GPR funding (the Unforeseen Conditions Allowance is ineligible and has been excluded from the loan amount).

The principal forgiveness amount was determined using 50-percent of GPR associated costs.

$2,570,000 \times 50\% = \$1,285,000$

Therefore, the total principal forgiveness amount for the project is \$1,285,000.

Hartman, Izabel (DNRE)

From: Beauchamp, Dan (DNRE)
Sent: Monday, July 19, 2010 2:12 PM
To: Hartman, Izabel (DNRE)
Subject: RE: Southgate/Wyandotte- Green Project Reserve Determination (SRF 5392-01)

Izabel,

I have reviewed the business case provided by the Southgate-Wyandotte Relief Drain Drainage District – Sequenced Operation Project (SRF Project No 5392-01) for qualification for green project reserve funding contained in P.L. 111-88.

The Drainage District proposes to install system controls and instrumentation that will allow the facility to act as a first flush facility. The improvements will allow the facility to operate with only one basin on-line initially and filled with first flush flow prior to opening the second basin and isolating the first. With these improvements, the facility will be reduce the amount of chemical disinfectant and power consumption because chemical feed and mixing will not occur until the first flush basin is full.

The Drainage District estimates that there will be an annual disinfection energy reduction of greater than 25%. The assumptions used by the Drainage District appear to be sufficient. **Due the energy reduction of 25%, the District supports that the Sequenced Operation Project be considered for green project reserve funding.**

If you have any questions or need any addition clarification, feel free to contact me.

Dan Beauchamp, PE
Environmental Engineer
Public Wastewater & Drinking Water Unit
DNRE Water Bureau
Southeast Michigan District

Phone: (586) 753-3756
Fax: (586) 753-3751
E-mail: beauchampd@michigan.gov

SOUTHGATE-WYANDOTTE RELIEF DRAIN DRAINAGE DISTRICT



SRF# 5392-01

SEGMENT 1: SW-8A, RETENTION TREATMENT FACILITY SEQUENCED OPERATION PROJECT

BUSINESS CASE FOR THE 20 PERCENT GREEN PROJECT RESERVE CLEAN WATER STATE REVOLVING FUND

June 23, 2010

INTRODUCTION

The purpose of this Business Case for the Southgate-Wyandotte Retention Treatment Facility (RTF) Sequenced Operation (S-O) Project (SW-8A, SRF# 5392-01 (Proposed Segment 1) is to present the finding that this project qualifies for the Green Project Reserves Funding under the American Recovery and Reinvestment Act (ARRA). This project was presented in the 2009 SRF Project Plan for the Southgate-Wyandotte Relief Drains Drainage District (District). The proposed improvements to the Retention Treatment Facility which would allow this facility to significantly reduce the use of sodium hypochlorite disinfectant while saving more than 25% of the disinfection electrical energy. Specifically, this project meets Section 3.2-2 (Energy Efficiency) and Section 4.5-a and b (reduction in chemical use) provision of the *2010 Clean Water and Drinking Water State Revolving Fund 20 Percent Project Reserve: Guidance for Determining Project Eligibility April 21, 2010*.

CURRENT OPERATIONS

The District has three main facilities to accommodate combined sewage; Pump Station No. 5 (PS No. 5), Retention Treatment Facility (RTF), and Pine Street Pump Station (PSPS). All flow at the PS No. 5 in excess of the purchase capacity to the Downriver Wastewater Treatment Facility is pumped to the 15 million gallon (MG) Combined Sewer Overflow (CSO) basin for settling and disinfection. The 15 MG basin is comprised of two-7.5 MG basins. Disinfection is accomplished with sodium hypochlorite, utilizing chemical feed pumps, induction mixers, sampling pumps, ancillary equipment and controls. Currently all the combined sewage flow is sent to both basins simultaneously in parallel operation. Unfortunately flow cannot be diverted to either basin because flow control means are not currently available. In order to meet National Pollutant Discharge Elimination System (NPDES) disinfection limits, operators disinfect the first flush flow by pumping a heavy dose of sodium hypochlorite at the initial stage

of rain events. Once this heavy feed or "supercharging" is accomplished, the disinfection feed continues at lower concentrations as the basins fill.

SUMMARY OF PUMPING EVENTS

As presented in the 2009 SRF Project Plan, the total number of events were tabulated and categorized into various sized events, based on the volume pumped at PS No. 5. The summary for these data are summarized below:

Summary of Pumping Events at PS No. 5			
No.	Description	% of Total	Cumulative
150	Total number of pump "events"	100%	--
37	Volume pumped in event is < 7.5 MG	25%	25%
34	Volume pumped in event is between 7.5 and 15 MG	23%	48%
79	Volume pumped in event is > 15 MG	52%	100%

Note: Data from Jan. 2000 thru July 2005 (Excluding Sept. 2003)
An "event" is considered to be consecutive days of pumping or rainfall.

As shown above, 25% of the pumping events do not exceed the volume of one basin. Yet chemical is fed to the basins regardless of whether the combined sewage flow is enough to actually fill the basin and overflow. Operators need to feed the heavy supercharged dose and continue the disinfection process because it is never known at the start of an event if there will be an overflow. The inability to isolate basins not only necessitates the use of chemical during smaller rain events, but also requires unnecessary power use to operate the disinfection system chemical and sampling pumps and induction mixers.

SEQUENCED OPERATION

To reduce the heavy use of chemical disinfectant and power consumption, only one basin would be on-line and filled with first flush flow prior to opening the second basin and isolating the first. (This is in not currently possible with the existing facilities.) Chemical feed and mixing will not begin until the first basin is full and the second basin is brought online. The benefits of Sequenced Operation include:

- o Elimination of chemical feed for 25% of all pumping events, and the first 7.5 MG of all remaining pumping events
- o Elimination of "supercharging" for all first flush events
- o Elimination of chemical pumping and mixing power for 25% of all pumping events, and the first 7.5 MG of all remaining pumping events
- o Reduction of disinfection by-products and improved basin performance

REQUIRED IMPROVEMENTS

Sequenced Operation will require flap gate installations, new basin influent control gate actuators, basin flushing and drain valves and actuators, and other ancillary process equipment. Automatic system control and instrumentation is required to integrate S-O control to Pump Station No. 5 operation and new programming logic is required for the disinfection chemical feed system. New level monitoring instruments are required to determine first flush basin level, and new control cabinets with an

uninterruptable power supply (UPS) are also required. The S-O control components would be networked to Pump Station No. 5 and integrated into the future Supervisory Control and Data Acquisition (SCADA) system.

CHEMICAL AND POWER REDUCTION AND COST SAVINGS

Chemical Reduction and Cost Savings

Chemical (sodium hypochlorite) costs are reduced by eliminating supercharging for all first flush flow events, and eliminating sodium hypochlorite feed to the first-flush basin. The 2009 SRF Project Plan identified the chemical cost reduction to be \$40,500 for supercharging, and an additional \$7,740 savings for not chlorinating the first basin, for a total annual savings of up to \$48,240. Because first flush solids are variable, the plan assumed conservatively that S-O would be employed 50% of the time, which equates to an annual savings of \$24,120. This represents a greater than 25% savings of annual chemical use.

Power Reduction

Power is saved by not running the chemical pumps, sample pumps and induction mixers while one basin is filling. There are 2-1 Hp chemical feed pumps, 2-3 Hp sample pumps and 4-10 Hp induction mixers, which all run during disinfection. The total disinfection system horsepower load is therefore 48 Hp. (Building and ancillary loads are not included.) Because S-O will eliminate disinfection power consumption for 25% of all pumping events, and disinfection power consumption for the first 7.5 MG all remaining pumping events, this represents an annual disinfection energy reduction significantly greater than 25%. This performance exceeds the Green Project Reserve criteria, which is stated in the guidelines as "3.2-2. Projects that achieve a 20% reduction in energy consumption are categorically eligible for GPR."

MISCELLANEOUS

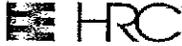
The chemicals applied during the disinfection process end up creating chlorination by-products and reaction end products. Chlorine oxidizes organic matter which can create chlorination by-products, including trihalomethanes, and other compounds which are harmful to humans and the environment, some of which have been shown to increase the risk of cancer. The 2009 SRF Project Plan also documents improved basin performance under first flush conditions. Therefore the implementation of the S-O Project will enhance the water quality of the Detroit River by reducing these disinfection by-products and other chemical and organic pollutants from the discharge.

COSTS

The 2009 SRF Project Plan identified costs for the Sequenced Operation and Parallel Operation alternatives as \$2,344,000 and \$2,078,000 respectively. Sequenced Operation will cost \$266,000 more than Parallel Operation, but will save between \$24,120 and \$48,240 annually in chemical costs and greater than 25% of the disinfection system electrical energy. Sequenced Operation is expected to need an additional \$8,750 per year for the instrumentation O&M. Inflation is assumed to be 3.5% annually. The expected payback for S-O is between 7 and 14 years, for the maximum and minimum chemical savings respectively.

Attachments

2009 SRF Project Plan project costs for Sequenced Operation and Parallel Operation



HUBBELL, ROTH & CLARK, INC
Consulting Engineers

TABLE D-3

ENGINEER'S OPINION OF PROJECT COSTS

OWNER Wayne County Department of Environment
 PROJECT S-W SRF Project Plan
 WORK: SW-8A RTF Sequenced Operation
 BASIS OF ESTIMATE:
 Report Design Final
 50% 90%

Est. Date 5/14/2009
 Project No. 20090190.02
 By: THS
 Ck'd by: _____
 CCI: Time of Est. 8,534
 CCI: Current 8,534

No	TYPE	QUAN	UNIT	ESTIMATE	SUB TOTAL
DIV. 02	CIVIL / SITE				
1	Site Restoration	1	LS	5,000	\$5,000
				Subtotal:	\$5,000
DIV. 03	CONCRETE				
1	Gate Access Vault	1	EA	20,000	\$20,000
				Subtotal:	\$20,000
DIV. 04-10	ARCHITECTURAL				
1	Vault Grating	1	LS	5,000	\$5,000
				Subtotal:	\$5,000
DIV. 11	EQUIPMENT				
1	Flat Gates	2	EA	37,000	\$74,000
2	12'x10' Sluice Gates Actuators	2	EA	25,000	\$50,000
3	Plug Drain Valves	2	EA	42,000	\$84,000
4	Knife Gate Valve	1	EA	29,000	\$29,000
5	Flushing Valves	29	LF	9,800	\$284,000
6	Sample Pump	1	LF	28,200	\$28,000
7	Effluent Gate Actuator	1	LS	18,000	\$18,000
8	Demolition	1	LS	10,000	\$10,000
				Subtotal:	\$577,000
DIV. 16	ELECTRICAL				
1	Power and Control Wiring and Conduit	1	LS	241,550	\$242,000
2	Instruments	1	LS	60,000	\$60,000
3	Controls	1	LS	134,260	\$134,000
4	Programming	1	LS	53,820	\$54,000
				Subtotal:	\$490,000
				TRADES SUBTOTAL	\$1,097,000
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			\$165,000
DIV. 01	General Requirements	7.5%			\$82,000
	Contingencies	40%			\$439,000
				Subtotal:	\$1,783,000
	PROJECT COSTS				
	Engineering	25%			\$446,000
	Force Account	3%			\$53,000
	Escalation	3.5%	per yr.	3.5%	\$62,000
				TOTAL	\$2,344,000
	Adjustment of Costs from ENR CCI	1.00			\$ 2,344,000
ENGINEER'S OPINION OF PROJECT COSTS					\$ 2,344,000



HUBBELL, ROTH & CLARK, INC
Consulting Engineers

**TABLE D-5
ENGINEER'S OPINION OF PROJECT COSTS**

OWNER Wayne County Department of Environment
 PROJECT S-W SRF Project Plan
 WORK: Parallel Operations
 BASIS OF ESTIMATE:
 Report Design Final
 50% 90%

Est. Date 5/14/2009
 Project No. 20090190.02
 By: THS
 Ck'd by: _____
 CCI: Time of Est. 8,534
 CCI: Current 8,534

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	SUBTOTAL
DIV. 02	CIVIL / SITE				
DIV. 11	EQUIPMENT				
2	12'x10' Sluice Gates Actuators	2	EA	25,000	\$50,000
3	Plug Drain Valves	2	EA	42,000	\$84,000
4	Knife Gate Valve	1	EA	29,000	\$29,000
5	Flushing Valves	29	LF	9,800	\$284,000
6	Sample Pump	1	LF	28,200	\$28,000
7	Effluent Gate Actuator	1	LS	18,000	\$18,000
8	Demolition	1	LS	10,000	\$10,000
				Subtotal:	\$503,000
DIV. 16	ELECTRICAL				
1	Power and Control Wiring and Conduit	1	LS	230,450	\$230,000
2	Instruments	1	LS	60,000	\$60,000
3	Controls	1	LS	134,260	\$134,000
4	Programming	1	LS	45,747	\$46,000
				Subtotal:	\$470,000
				TRADES SUBTOTAL	\$973,000
	CONTRACTUAL REQUIREMENTS				
DIV. 00	General Conditions	15%			\$146,000
DIV. 01	General Requirements	7.5%			\$73,000
	Contingencies	40%			\$389,000
				Subtotal:	\$1,581,000
	PROJECT COSTS				
	Engineering	25%			\$395,000
	Force Account	3%			\$47,000
	Escalation	3.5%	per yr.	3.5%	\$55,000
				TOTAL	\$2,078,000
	Adjustment of Costs from ENR CCI	1.00			\$ 2,078,000
ENGINEER'S OPINION OF PROJECT COSTS					\$ 2,078,000

BID FORM

Failure to complete the Bid Form shall result in your Bid being deemed non-responsive and rejected without any further evaluation.

OFFER

TO: THE SOUTHGATE-WYANDOTTE RELIEF DRAINS DRAINAGE DISTRICT:

The Undersigned hereby offers and agrees to furnish the goods and/or services in compliance with all terms, scope of work, conditions, specifications, and addenda in the Invitation for Bid.

ADDENDA:

The undersigned has read, understands and is fully cognizant of the Instructions, Specifications And/Or Scope Of Work, Required Forms, Agreement, all Exhibits thereto, and all contents of this document, together with any written addendum issued in connection with any of the above. The undersigned hereby acknowledges receipt of the following addendum(s): 1, 2, 3, 4 (write "none" if none). In addition, the undersigned has completely and appropriately filled out all required forms.

OBLIGATION:

The undersigned, by submission of this Offer, hereby agrees to be obligated, if selected as the Contractor, to provide the stated goods and/or services to the Owner, for the term as stated herein, and to enter into an Agreement with the Owner, in accordance with the Contract Documents, together with any written addendum as specified above.

COMPLIANCE:

The undersigned hereby accepts all administrative requirements of the IFB and will be in compliance with such requirements. By submitting this Bid Form, the Bidder represents that: 1) the Bidder is in compliance with any applicable ethics provisions of the County's Procurement Ordinance, and 2) if awarded a contract to provide the Construction, Goods or Services required in the IFB, the Bidder will comply with the County's Ethics Ordinance.

NON-COLLUSION:

The undersigned, by submission of this Bid Form, hereby declares that this Bid is made without collusion with any other business making any other Bid, or which otherwise would make a Bid.

GUARANTEES AND INSURANCES:

The undersigned further agrees that if awarded the Contract, it will submit to the County any required payment and performance guarantees and evidence of required insurance coverage within 10 days after acceptance of this bid.

BID PRICE:

The undersigned agrees to abide by the pricing contained on the Price Sheet.

ADDITIONAL PRICE INFORMATION:

Bidder has examined the conditions where the Work is to be performed, the legal requirements and local conditions affecting cost, progress, furnishing or performance of the Work and has made such

independent investigations as Bidder deems necessary.

BID DECLARATIONS:

This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over Owner.

The undersigned, as Bidder, hereby certifies that a qualified designated person in its employ has examined the Contract Documents provided for bidding purposes. Further, the undersigned certifies that he or a qualified employee has reviewed the Bidder's proposed construction methods and finds them compatible with the conditions and the information provided for Bidding.

The undersigned, as Bidder, shall complete the Work under any job circumstances or field conditions present and/or ascertainable prior to bidding. In addition, the Bidder shall also complete the Work under whatever conditions it may create by its own sequence of construction, construction methods, or other conditions it may create, at no additional cost to the Owner.

The undersigned, as Bidder, declares that he has familiarized himself with the location of the proposed Work and the conditions under which it must be constructed. Also, that he has carefully examined the Contract Documents, which he understands and accepts as sufficient for the purpose, and agrees that the Bidder will Contract with the Owner to furnish all labor, material, tools, and equipment necessary to do all Work specified and prescribed for the completion of the Project.

The undersigned, as Bidder, hereby certifies that the Wayne County SCADA System Standards have been downloaded, that the Bidder has thoroughly examined these standards and has incorporated all provisions in to the Bid.

The undersigned, as Bidder, agrees that time is of the essence and, if awarded Contract, that the Work will be Substantially Completed and completed by the dates or days as specified in the Contract Documents.

The undersigned, as Bidder, agrees that liquidated damages, as specified in the Supplementary Conditions shall also apply to the Substantial Completion date.

The undersigned, as Bidder, agrees that all engineering and inspection costs incurred after the final completion date shall be paid by the Bidder as Contractor to the County as specified in the Contract Documents.

No Bid shall be accepted which has not been manually signed in ink in the appropriate space below:

I certify, under penalty of perjury, that I have the legal authorization to bind the firm hereunder:

For clarification of this offer, contact:

Weiss Construction Co., LLC
Company Name

Name: John Arvai, P.E.

400 Renaissance Center, Suite 2170
Address

Title: Chief Estimating Officer

Detroit, Michigan 48243
City State Zip

Phone: 313-567-4500

Daniel Weiss
Signature of Person Authorized to Sign

Fax: 313-567-7635

Daniel Weiss
Printed Name

Email: jarvai@weiss-construction.com

Sole Memeber
Title

38-3439816
Federal Tax ID

Acknowledged before me by Vickie L. Abernethy (name) as Notary (title)
of Weiss Construction Co, LLC (company) this 15th (day) of July, 2011.

Notary Signature: *Vickie L. Abernethy*

My Commission Expires: July 31, 2016

Affix Seal

VICKIE L. ABERNETHY
Notary Public, Wayne County, Michigan
MY Commission Expires: July 31, 2016

PRICE SHEET

Failure to complete the Price Sheet shall result in your Bid being deemed non-responsive and rejected without any further evaluation.

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Total Cost</u>
1.Division 00/01			
1.1 Mobilization	1 LS	=	\$ <u>60,000</u>
1.2 Construction Administration	1 LS	=	\$ <u>50,000</u>
1.3 Construction Close-out / Demob	1 LS	=	\$ <u>45,000</u>
2. Civil/Site	1 LS	=	\$ <u>27,000</u>
3. Structural			
3.1 Flushing Header Curb	350 EA	@ \$ <u>830</u>	= \$ <u>290,500</u>
3.2 All Remaining Work	1 LS	=	\$ <u>54,300</u>
4.Process/Mechanical			
4.1 Flushing Nozzles	420 EA	@ \$ <u>128</u>	= \$ <u>53,760</u>
4.1 Strainer Rehabilitation	2 EA	@ \$ <u>60,000</u>	= \$ <u>120,000</u>
4.1 Flushing Pump Rehabilitation	3 EA	@ \$ <u>11,000</u>	= \$ <u>33,000</u>
4.1 All Remaining Work	1 LS	=	\$ <u>425,000</u>
5.Electrical			
5.1 Electrical Work	LS	=	\$ <u>203,000</u>
5.2 Direct Buried 2" Conduit	200 FT.	@ \$ <u>13.00</u>	= \$ <u>2,600</u>
5.3 #12 Building Wire	2700 FT.	@ \$ <u>.50</u>	= \$ <u>1,350</u>
5.4 #10 Building Wire	1200 FT.	@ \$ <u>.57</u>	= \$ <u>684.00</u>
6. Instrumentation-and Control	1 LS	=	\$ <u>169,000</u>

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Total Cost</u>
7.Programming			
7.1 Procurement, Installation and Configuration of SCADA System Network Hardware, software and PLC Equipment	1 LS	=	\$ <u>228,500</u>
7.2 PCN Preparation	1 LS	=	\$ <u>5,500</u>
7.3 Process Control Programming	1 LS	=	\$ <u>15,300</u>
7.4 iFIX Process Overview Screens	15 EA	@ <u>415.⁰⁰</u>	= \$ <u>6,225</u>
7.5 iFIX Equipment Pop-up Graphics	50 EA	@ <u>76.00</u>	= \$ <u>3,800</u>
7.6 iFIX Trend Screens	10 EA	@ <u>455.00</u>	= \$ <u>4,550</u>
7.7 PLC Health Screens	2 EA	@ <u>415.00</u>	= \$ <u>830.⁰⁰</u>
7.8 SCADA Programming	1 LS	=	\$ <u>3,900</u>
7.9 Testing	1 LS	=	\$ <u>25,700</u>
7.10 End of Warranty Programming Enhancements	80 HRS	@ <u>108.⁰⁰</u>	= \$ <u>8,640</u>
7.11 All Remaining Division 17 Work	1 LS	=	\$ <u>15,000</u>
8.Allowances:			
8.1 Allowance for City of Wyandotte Construction Permits	1 LS	=	\$ <u>37,000.00</u>
8.2 Allowance for Electrical Equipment Repair	1 LS	=	\$ <u>50,000.00</u>
8.3 Allowance for 360 Water Training Materials	1 LS	=	\$ <u>10,000.00</u>
8.4 Allowance for Switchgear Breaker Repair	1 LS	=	\$ <u>25,000.00</u>
8.5 Allowance for Unforeseen Conditions	1 LS	=	\$ <u>250,000.00</u> (ineligible)
Total Amount of Bid			= \$ <u>2,225,139 *</u>

Note: Time of Completion and Liquidated Damages is identified in the Agreement and Supplemental Conditions, respectively.

*Eligible SRF amount is \$1,975,139

ADDENDUM NO. 4