GLWA
Great Lakes Water Authority

Appendix B: Sewer Business Case Evaluations

Please consider the environment before printing this document.

Contents

Ordered by old CIP number

New CIP Numbers

CIP 291
New CIP 211011

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
PROJECT PROPOSAL

Replaced old Proposal of 1999 as more scope of work added

Title: Improvements to Rectangular Primary Clarifier Pipe Gallery And Rehabilitation of Scum Cross Collectors

CIP: SEWERAGE (WWTP)

1) **Problem Statement:**

a) The sludge pumps have difficulty maintaining pumping capacities when an adjacent sludge pump (on either side) is started. Normally, the decrease in capacity occurs at the sludge pumping unit which has more wear on the pump or belts. The operators and stems on inlet sluice gates and in some cases and gears are in poor condition. The gears have stripped, making their operation difficult. Replacement of the sluice gate operators is required. There is lead and asbestos in the pipe gallery. Electrical/Mechanical Building Nos. 1 through 4 are of older construction and require extensive structural and architectural rehabilitation. Water ponding occurs on the floor of the gallery due to poor drainage. The base supports of the sludge pumps are deteriorating and require replacement. Lintels structure to doors and windows of stairwell enclosures are corroded. Cracks along walls and roof slab of the Pipe Gallery and stairwell enclosures were observed between Clarifier Nos. 9 through 12. Based on original contract drawings, the Pipe Gallery's current ventilation system provides two (2) air changes per hour (AC/H). An increase in fresh air ventilation volume to six (6) air changes per hour would meet the current code requirement. Outdoor lighting fixtures are quite old and need to be rehabilitated with new and improved lighting. There are several access panels missing from the Electrical/Mechanical (E/M) Building No. 5. The explosion-proof combination motor starters inside the Pipe Gallery servicing the 40 HP sludge pumps are at least 30 years old. In some cases replacement parts are difficult to find. Some of the starters have no "Running" and "Malfunction" indication lights. The functional identification tags of explosion-proof toggle switches inside the E/M Buildings are missing (For more details refer to PDS -DWP-1085).

b) The scum cross collectors in the rectangular tanks are corroded. Chains and flights need replacement. Chains and flights do not flex. Scum collection guide rail support structure is heavily corroded and as a result of corrosion, these are detached from the walls at various places.

2) **Potential Alternative Solutions:** Alternatives were evaluated during PC-744 Project Definition Statement (PDS) phase of project DWP-1038, DWP-1085, and DWP-1046. But replace and rehabilitation is the viable solution.

3) **Operational Benefits of Proposed Project:** Improvements to Rectangular Primary Clarifier Pipe Gallery and Rehabilitation of Scum Cross Collector will result in reduced equipment outage and reduced emergency maintenance work. Scheduled routine preventive maintenance programs will ensure that equipment will remain in good condition and will meet latest OSHA and MIOSHA safety standards and reduce the potential for violations, and improved working environment. Installation of New Sludge pump with timers will result in a more efficient sludge pumping operation.

CIP PROJECT PROPOSAL

PROJECT TITLE: Improvements to Rectangular Primary Clarifier Pipe Gallery And Rehabilitation of Scum Cross Collectors

4) **Financial Benefits of Proposed Project:** Improved operating efficiency will reduce the operation and maintenance cost, and reduce the potential for OSHA and MIOSHA safety violations.

5) **Preliminary Scope of Work**: The following items have been identified to be included in the preliminary scope of the work:

a) Rehabilitation of Rectangular Primary Clarifier Pipe Gallery:

1. Sludge Pumps and Piping
2. Install New Motor actuators
3. New ventilation system
4. Eliminate Flooding
5. Structural and Architectural rehabilitation
6. Improve outdoor lighting

b) Rehabilitation of Scum Conveyor - Skimmer for 12 rectangular tanks:

1. Replace HS 730 High Strength carry chain)
2. Replace fiberglass Flights wear shoes and wipers
3. Replace sprockets, shafts, wall bearings, bolts
4. Replace steel carry and return tracks, skimmer troughs
5. Replace drive units

12) **Related Work Currently Underway or Planned:**

DWP-1015	Trough and Weir Replacement
DWP-1019	Work Environment Improvement Master Plan
DWP-1038	Improvement to Scum Collection System
DWP-1046	Rectangular Tanks Primary Electrical Feed
DWP-1082	Sludge Pumping Station No. 1 and 2 Rehabilitation
DWP-1085	Electrical Mechanical building and Pipe Gallery Rehab for Primary rectangular clarifiers

7) **Time Requirements:**

	Start	**Finish**	**Duration**
Study	July 1st, 2005	April 1st, 2006	9 months
Design	April 30th,2006	Oct 30th, 2007	18 months
Construction	Nov 1st, 2007	May 30th, 2010	30 months

8) **Preliminary Cost Estimate:**

Study	-	$ 150,000
Design	-	$ 1,328,000
Construction	-	$10,072,450
TOTAL		**$11,550,450**

CIP PROJECT PROPOSAL

PROJECT TITLE: Improvements to Rectangular Primary Clarifier Pipe Gallery And Rehabilitation of Scum Cross Collectors

9) Identification of In-House Responsibility:

Design	- WWTP Facilities Engineering Group
Construction	- Wastewater Engineering Services Group
Maintenance	- Gary Jacubus
Operations	- Daryl Ivory

10) Reference Materials:

DWSD Contract -TN-6
DWSD Contract DWS-24, DWS-92

Submitted by: Kamlesh Kumar — Date: 5 20 05
Sr. Associate Mechanical Engineer

Recommended: Sidney H. Bailey III — Date: 5/23/05
Head Engineer of Water Systems

Approved: Louis Lieberman — Date: 6/23/05
Asst. Director WWOP

CIP PROJECT PROPOSAL
Present Value/Life Cycle Cost Analysis Worksheet

PROJECT TITLE: Improvements to Rectangular Primary Clarifier Pipe Gallery And Rehabilitation of Scum Cross Collectors

1) Life Cycle of the equipment considered = 20 years
Escalated /inflation Considered = None
Life Cycle Cost Factors
Discount rate = 7%
Project Capital Costs:

Design and Installation cost for the new equipment		
Estimated Study Phase Consultant fee		
Estimated Study Phase Force Account	$150,000	
Estimated Design Phase Consultant fee		
Estimated Design Phase Force Account	$1,328,000	
Estimated Consultant Cost (Contractor)	$8,802,000	
Estimated Construction Phase Consultant fee		
Estimated Construction Phase Force Account	$1,270,450	
Project Cost =	**$11,550,450**	1

2) **Design Construction Period Interest**
Considering 1.5 year of Design and 2.5 years of construction (n=4)
Interest I = 1*0.5*n*C = **$1,617,063** 2

3) **Additional Annual operation and Maintenance Cost:**

Operation Labor Cost	$135,000
Maintenance Labor Cost	$130,000
Equipment and Services Cost	$ 6,000
Energy cost	$ 65,000
Hauling and disposal Cost	$200,000
Cost of Materials	$110,000
Annual O and M Cost	**$646,000**

Present Value P of O&M Cost = A*((1+I) n -1/I*(1+i)n) **$6,843,724** 3
or P=A (P/A,7%.20)
NPV Factor for operating costs = 10.6

5) **Salvage Value**
Assuming Present Salvage Value $0 4

6) **Total Present Value (1+2+3+4)**
($11,000,450.00 + 1,155,047.25+ 0+ 6,843,724) = **$20,657,237**

CIP PROJECT PROPOSAL
Preliminary Cost Estimate Worksheet

PROJECT TITLE: Improvements to Rectangular Primary Clarifier Pipe Gallery And Rehabilitation of Scum Cross Collectors

Study Phase		
Consultant Fee		
In-house Force Account	$150,000	
SUBTOTAL Study Phase	$150,000	1
Design Phase		
Consultant Fee		
In-house Force Account	$1,328,000	
SUBTOTAL Design Phase	$1,328,000	2
Construction Phase		
Construction Cost		
Architecture	$345,000	
Civil Items	$1,200,000	
Mechanical Items	$4,065,000	
Electrical Items	$600,000	
I&C	$345,000	
Drafting	$207,000	
Miscellaneous	$138,000	
Subtotal	$6,900,000	
Add 3% for Mobilization & Demobilization	$207,000	
Subtotal	$7,107,000	
Add 15% for G.C./O.H./Profit	$1,035,000	
Subtotal	$8,142,000	
Provisionary/Contingency Allowance 10%	$660,000	
Subtotal say	$8,802,000	
In-house Force Account	$1,270,450	
SUBTOTAL Construction Phase	$10,072,450	3
GRAND TOTAL (1+2+3)	**$11,550,450**	

GLWA ...rs Water Authority
...rovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 211001

CIP #: 291

Project Title: **Rehabilitation of Primary Clarifiers Rectangular Tanks, Drain Lines, Electrical/Mechanical Building and Pipe Gallery**

Contract Number:

Description: Rehabilitation for meeting NPDES Permit and NEC requirements

Lead Division:

Division Leader:

Project Manager: Phillip Kora

Phone:

Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 41,055

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-			$ 10,848	$ 12,097	$ 20,990	$ 7,968	$ -	$ -	$ -	51,903
617950	Contractual Engineering Service		-				$ -	$ -	$ -	$ -	$ -	$ -	-
	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 10,848	$ 12,097	$ 20,990	$ 7,968	$ -	$ -	$ -	$ 51,903
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-	10,848	12,097	20,990	7,968	-	-		51,903
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ 10,848	$ 12,097	$ 20,990	$ 7,968	$ -	$ -	$ -	$ 51,903

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$10,848	$12,097		$20,990	$7,968	$0	$0	$0	$51,903

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

366

CIP 366

New CIP 216001

Detroit Water & Sewerage Department
Capital Improvement Program
Project Proposal

Title: Underground Electrical Duct Bank Repair At WWTP

CIP: SEWERAGE

Problem Statement

In the fall of 1986 the underground duct banks serving the oxygen plants and Aeration Decks No.3 and No. 4 (at the Wastetwater Treatment Plant) collapsed. This made it necessary to provide temporary above-ground power feeds from EB-1 to the oxygen feeds and the aeration decks. Furthermore, it was later discovered that the combination of offset joints and flooding in the conduits have made the ducts no longer functional.

If repairs are not made to the duct banks and a solution to the groundwater infiltration problem is not implemented, the Wastewater Treatment Plant (WWTP) will experience continued interruption of electrical service to the critical areas mentioned, irreparable damage to DWSD property in the affected areas and possible safety risks to WWTP staff. Therefore, we consider this project of high priority.

Potential Alternative Solutions

On July 20, 1995, Metcalf & Eddy (under CS-1062) submitted their recommendations for solutions to the above mentioned problems. The summation of their proposed solutions are as follows:

Alternative 1:

Adopt permanent relocation of all 5KV and 15KV power duct banks between Compressor Building and Copeland Gate from Original routings under 8th Street to above-ground routing along railroad tracks; reconstruct underground duct banks between EB-1 and Compressor Building using rigid conduit.

Alternative 2:

Improve drainage from electrical cable vaults and manholes without relocating any cables or conduits.

Alternative 3:

Provide drainage along existing 15KV underground duct bank between Compressor Building and Copeland Gate. Protect existing above ground duct banks. No replacement of any cables or conduits.

Alternative 4:

Replace all 5KV and 15KV cables from EB-1 to Copeland Gate to EB-9 in new under ground ducts banks, providing support under duct banks where necessary.

After reviewing the pluses and minuses of each alternative (see enclosed report) the Wastewater Design Group has decided that Alternative 4 is the optimum solution for DWSD.

Operational Benefits of Proposed Project

Once completed, this project would insure the uninterrupted operation of the system critical aeration process. It would also increase the useful life of the cable installed in the duct as well as impede the deterioration of the affected site.

The existing above grade temporary ducts compromise operations by being vulnerable to the elements, traffic, and the corrosive environment at WWTP. Furthermore, plant personell may trip over or be schocked by (if the cable is damaged or exposed) these ducts).

Financial Benifits of Project Proposal

The oxygen plants powered via the effected duct banks are critical to the aeration process. DWSD could recieve up to $25,000.00 a day in fines from the Michigan Department of Environmental Quality for permit violations were this system to fail.

Preliminary Scope of Work

The scope of work for this project is as follows:

1. Develop drawings and specifications (biddable documents) based on chosen alternative solution.

2. Assist with advertisement and selection of successful bidder.

3. Monitor contractor compliance with the design documents with the following tasks:

   A. Site preparation, i.e., placement of piles and excavation.

   B. Installation of new ducts.

   C. Placement of new electrical cable.

   D. Coordinate system shut down.

   E. Coordinate system reconnection with new cables.

Related Projects Currently Underway or Planned

No similar project currently underway or planned.

Time requirements

Based on similar projects, the Wastewater Design Group estimates about 8 months for design (inclusive of bid advertisement and contractor selection) and 18 months for construction.

Preliminary Cost Estimate

Based on the costs of similar projects, the Wastewater Design Group estimates about $600,000 for in-house costs and, according to Metcalf & Eddy of Michigan, the construction and consultant cost would be over $4,000,000.00. Therefore, the Wastewater Design Group estimates that this project would cost $4,932,573.72. Please refer to the attached estimate sheet and detailed cost breakdown for more information.

In-house responsibility

The tasks involved in the project are detailed and non-standard. For these reasons the actual design will be handled by a consultant, with the Wastewater Design Group which is headed by Sidney H. Bailey III managing the design phase. Since the purpose of this project is to insure reliable electrical service to the aeration decks, the Project Engineer will be Andre Lowe of the Electrical Section in the Wastewater Design Group.

When the project enters the construction phase it will be managed by the staff of the Wastewater Construction Group Headed by John W. McGrail. His group will handle construction progress, inspections and the other construction related tasks.

Reference Materials

As stated earlier, there is an enclosed copy of the report done by Metcalf & Eddy of Michigan Inc. for more detailed information. Also, a cost estimate worksheet with a detailed cost breakdown is enclosed for your review.

Submitted: Andre Lowe for Sidney H. Bailey III Date: 05/07/98

Recommended: _____ Date: ___/___/___

Approved: _____ Date: ___/___/___

Net Present Value of Proposed Project

The net present value of this project $1,000,000.00

This was obtained by the following:

The existing underground duct bank is flooded and partially collapsed. It must be replaced. If it collapses it will take 4 months (120 days to do emergency repairs).

The above ground duct is temporary and it would take 4 months to repair in an emergency.

Each day that either of these systems is down DWSD would incur $25,000.00 in penalties from MDEQ (Michigan Department of Environmental Quality).

This could cost the Department (120 + 120) x $25,000.00 = $6,000,000.00.

This project is estimated to cost $5,000,000.00.

Therefore, $6,000,000.00 - $5,000,000.00 = $1,000,000.00

GLWA ...s Water Authority
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REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 216001

CIP #: 366

Project Title: **Underground Electrical Duct Bank Repair and EB-1, EB-2, and EB-10 Primary Power Service Improvements - WRRF**

Contract Number:

Description: Procure and install electrical power system to meet safety standards and prove third redundant electric feeder per NPDES permit

Lead Division: | Division Leader:

Project Manager: Eric Kramp | Phone: | Department Charged: | Water | Sewage | Both

Project Type: Study **(S)** X | Design **(D)** X | Construction **(C)** X | Construction Management **(CM)** | Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X | Design Build **(DB)** | Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 1,532 | Estimated Start Date *: | Estimated Completion Date *:

In-House Project Costs

Project Costs $(00)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	21,037	1,925	$ 2,500	$ 1,532	$ -	$ -	$ -	$ -	$ -	26,994
617950	Contractual Engineering Service		-		75	75	$ -	$ -	$ -	$ -	$ -	$ -	150
	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 21,037	$ 2,000	$ 2,575	$ 1,532	$ -	$ -	$ -	$ -	$ -	$ 27,144
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	21,037	2,000	2,575	1,532	-		-	-		27,144
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 21,037	$ 2,000	$ 2,575	$ 1,532	$ -	$ -	$ -	$ -	$ -	$ 27,144

(000)	FY 2016-17	FY 2017-18	PROJECTED FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$25,612	$1,532	$0	$0	$0	$0	$0	$27,144

Requested By: | Date:

Division Manager: | Date:

Division Director: | Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: | Yes | 0 No | CMG | Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: | Date:

Finance Manager

Accounting Approval: | Date:

Authorization to Proceed: | Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 | **Cost Center** 0 | **Object No.** 0 | **WSS Project No.:** 0

S Fund No: 0 | **Cost Center** 0 | **Object No.** 0 | **SDS Project No.:** 0

CIP 961

New CIP 211002

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
PROJECT PROPOSAL

Title: Pump Station No. 2 Pumping Improvements

CIP: SEWERAGE (WWTP)

1) **Problem Statement:** Pump Station No. 2 has seven raw sewage pumps and was placed into service in 1994 with an eighth pump scheduled to be installed by September 2003. A gradual decline in pumping capacity occurs after each pump is placed in service. Pumping capacity is restored when the pump is restarted or after significantly reducing, then increasing, the speed of the variable speed pumps. The variable frequency drives (VFDs) for the pumps have recently experienced more frequent problems that reduce capacity of the pumps and spare parts and service for the VFDs are more difficult to obtain.

   The required pumping rate for raw wastewater in the NPDES permit is currently 1,520 mgd and will be 1,700 mgd when Primary Clarifiers Nos. 17 an 18 and Pump No. 10 at PS-2 are completed under PC-740. Plant recycles up to 100 mgd must also be pumped, thus increasing the required pumping capacity to about 1,800 mgd. With the gradual decline in pumping capacity, PS-1 and PS-2 are just able to pump this amount, leaving little to no margin for unexpected pump outages.

2) **Potential Alternative Solutions:** Alternatives to be evaluated during PC-744 Project Definition Statement (PDS) phase of project.

3) **Operational Benefits of Proposed Project:** The VFDs will be repaired or replaced to provide more reliable pumping capacity at PS-2 to meet permit-required flows during wet weather. Increased pumping capacity will allow more of a margin between actual and required pumping rates.

4) **Financial Benefits of Proposed Project:** No direct financial benefits

5) **Preliminary Scope of Work:** This project will evaluate and recommend alternatives for providing more reliable and additional pumping capacity at PS-2. The alternatives to be considered include:

   a. Add VFDs to the three constant speed pumps (keep existing pumps) to allow for restoring the pumping capacity during wet weather events.
   b. Repair existing VFDs on existing pumps, if feasible.
   c. Install new, larger VFDs on existing pumps.
   d. Install larger VFDs and larger pumps for three or more pumps.

   These alternatives will be compared with on-going alternatives (i.e., suction elbow modifications, and Pump No. 10 performance) and previously evaluated alternatives (modified suction well).

1) Related Work Currently Underway or Planned:

DWP-1007: Rehabilitation of PS-1
PC-740: Primary Clarifiers 17 and 18 (and installation of Pump No. 10 at PS-2)

2) Time Requirements:

PDS	-	7 months
Design	-	16 months
Construction	-	24 months

Construction of PS-2 pumping improvements must be initiated after DWP-1007 "Rehabilitation of PS-1", which is scheduled for completion by the end of 2005. The PDS which will be performed by DWP under PC-744, should be initiated mid-2003 so that construction can begin early 2006.

3) Preliminary Cost Estimate:

Design	-	$ 2,900,000
Construction	-	$16,000,000
TOTAL		**$18,900,000**

4) Identification of In-House Responsibility:

Thyagaraj Siddappa - Project Champion - Principal Contact
Gary Jakubus - Maintenance
Terry Moore - Operations

5) Reference Materials: None.

Submitted: Kaenluk Ku for Chaten Kinusano Date: 4/28/03
Recommended: [signature] Date: 4/29/03
Approved: L Lieberman Date: 4/30/03

Net Present Value Cost Analysis
Pump Station No. 2 Pumping Improvements

1)	**Capital Costs:**	$18,900,000
2)	**Operating Costs**	Similar to existing operating costs
3)	**Life Cycle Cost Factors**	Expected life = 20 years Discount rate = 7% NPV Factor for operating costs = 10.59
4)	**Net Present Value**	= Capital Costs + (NPV Factor * Ops Costs) = $18,900,000+ $0 = $18,900,000

GLWA ...s Water Authority
...rovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 211002

CIP #: 961

Project Title: **Pump Station No. 2 Pumping Improvements** **Contract Number:**

Description: Correct drifting issues of pumps and meet long term wet weather capacity needs

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 1,920 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-			$ 1,027	$ 1,232	$ 616	$ -	$ -	$ -	$ -	2,875
617950	Contractual Engineering Service		-	456	-	$ 130	$ 72	$ -	$ -	$ -	$ -	$ -	658
	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 456	$ -	$ 1,157	$ 1,304	$ 616	$ -	$ -	$ -	$ -	$ 3,533
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	456	-	1,157	1,304	616		-	-		3,533
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 456	$ -	$ 1,157	$ 1,304	$ 616	$ -	$ -	$ -	$ -	$ 3,533

(000)	FY 2016-17	FY 2017-18	PROJECTED FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$1,613	$1,304	$616	$0	$0	$0	$0	$3,533

0

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] Date:

(circle applicable funding source): **Bond** **I&E** CMG

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

CIP 1028
New CIP 216002

DETROIT WATER AND SEWERAGE DEPARTMENT

CAPITAL IMPROVEMENT PROGRAM

Title: Plant Wide Fire Alarm Systems Upgrade and Integration #1028

CIP : [redacted] & SEWERAGE

1. Problem Statement:

There are approximately 100 buildings geographically dispersed over several acres of land at the WWTP. Out of these, about 50 buildings are provided with standalone fire alarm systems. The majority of the remaining buildings are occupied and need fire alarm systems to mitigate fire damage and improve safety at the WWTP. The existing standalone fire alarm systems are not integrated and hence the plant employees on duty will have no remote nor plant wide fire warning of any fire incidents. An Integrated Plant Wide Fire Alarm System is required to facilitate central monitoring and plant wide annunciation of fire alarms. The integration of the existing standalone fire alarm systems and the new system proposed in this proposal will facilitate centralized monitoring and also assure faster corrective actions by the plant's personnel and local fire department. The system must be monitored and operable from, the new Plant Control Center (PCC) in the New Administration Building. This is a central location that is staffed 24 hours per day. The system can be interfaced with the new WWTP Control System as a way to utilize existing resources. Also, the signals associated with this system can be transmitted over the existing fiber optic cables as a physical media for interconnection of the standalone systems.

2. History (Background):

The plant's original buildings have been in existence for many years and new buildings are regularly being added as a part of plant improvements and expansion. The majority of buildings have process conditions or equipment, which could accidentally ignite. Of particular importance and vulnerability are the electrical buildings. These buildings should have a working fire detection system for protecting capital assets. There have been eight to ten major fire incidents that occurred over the past five-year period and resulted in damage to the process equipment and buildings. The 50 or so independent systems were installed as part of separate projects and only address the needs of the particular area or facility they are a part of. There is no centralized monitoring system to verify the existing systems' working condition and record fire alarms generated, and actions taken. An integrated fire alarm system will enable quicker response to the fire incidents and might assist in preventing major damage to the plant's assets.

3. Potential Alternate Solutions:

There are two alternate solutions. The first is to do nothing. The second is to institute a manual fire watch plan. An increased number of physical rounds will have to be performed to monitor and acknowledge the alarm events and take corrective action in a timely manner to prevent or minimize the damages due to fire incidents.

(i) Enhanced Safe Work Environment for the employees.
(ii) Protect City's Property from Fire Incidents.
(iii) Minimize disruption to Plant's Operation.

5. Financial Benefits of Proposed Project:

(i) By integration of fire alarm systems in the Plant, the monitoring will improve response time and result in reduction of Insurance premiums.

(ii) The time loss in reporting and extinguishing fire will be minimized and property damage due to fire events can be minimal.

6. Preliminary Scope of Work:

(i) Review applicable NFPA codes, regulations, and guidelines for Wastewater facilities and make recommendations on the detailed requirements. Conduct technical Study of the existing fire alarm systems in the plant and prepare a feasibility report to include list and type of existing fire alarm systems and integration options for the centralized alarm monitoring system.
(ii) Design and provide fire alarm/warning/notification systems in the plant's buildings that have high value and prone to fire accidents, where such systems are currently not existing.
(iii) Check the existing fire alarm systems and upgrade / rehabilitate all the non-functional systems.
(iv) Design and Integrate plant wide fire alarm systems at a central location.
(v) Provide required training for the plant staff, to operate and maintain the new integrated fire alarm system.

7. Related work currently underway or planned:

PC-720, PC – 744 DWP –1080 Fire Protection Improvements, DWS-834, PC-713, DWP-1077, CS-1255

8. Time Requirements :

	Start	Finish	Duration
Study	09-01-04	12-30-04	3 months
Design	01-01-05	06-30-05	6 months
Implementation	07-01-05	07-01-05	12 months

9. Preliminary Cost Estimate:

[I]	Study Phase:	$	50,000.00
[II]	Design Phase:	$	500,000.00
(III)	Implementation:	$	2,695,370.00
	Total	**$**	**3,245,370.00**

(Includes Force account, Insurance, Bonds etc.)

10. Present Value / Life Cycle Cost Analysis:

Present value estimated for 10 year life cycle of the plant wide integrated fire alarm system is $ 3,245,370.00 (See the attached "Present Value / Life Cycle Cost Analysis Worksheet)

11. Identification of In - House Responsibility:

WWTP Control Systems Engineering will be responsible for study, planning, and implementation of this project. Plant Operations, Safety, and Maintenance will provide detailed needs definition.

Contact Persons:	Sidney H. Bailey III, Head Engineer	(313-297-6471)
	Rao Manyam, Engineer of Water Systems	(313-297-6446)

12. Reference Materials:

PC-720, PC-744 DWP-1080, Operation and Maintenance manuals of existing fire alarm systems, NFPA 72 National Fire Alarm Code, and NFPA 820 Fire Prevention and fire protection administrative controls.

Submitted By: Rao M. Manyam for Sam Kapur **Date:** 03/31/04

Recommended By: Rao M. Manyam **Date:** 03/31/04

Approved By: L Lieberman **Date:** 4/13/04

CIP PROJECT PROPOSAL
Preliminary Cost Estimate Worksheet
Project Title: Plant wide Integrated Fire Alarm System

[I]	Study Phase:		
	Consultant Fee	$	30,000
	In - House Force Account	$	20,000
	SUBTOTAL Study Phase	$	50,000
[II]	Design Phase:		
	Consultant Fee	$	400,000
	In - House Force Account	$	100,000
	SUBTOTAL Study Phase	$	500,000
[III]	Construction Phase:		
	Civil Items (Concrete Blocks)	$	5,000
	Mechanical Items (Conduits, Panels)	$	200,000
	Electrical Items (Wiring, Relays, PLCs)	$	1,500,000
	Misc. Items	$	50,000
	Subtotal	$	1,755,000
	Add 3% for Mobilization & Demobilization	$	52,650
	Subtotal	$	1,807,650
	Add 15% for G.C/O.H/Profit	$	271,148
	Subtotal	$	2,078,798
	Provisionary/ Contingency Allowance 10%	$	207,880
	Subtotal	$	2,286,678
	Subtotal say	$	2,286,700
	Consultant Fees	$	228,670
	In-house Force Account	$	180,000
	Subtotal Construction Phase	$	2,695,370
	Grand Total (I+II+III)	$	3,245,370

CIP PROJECT PROPOSAL
Present Value / Life Cycle Cost Analysis Worksheet
Project Title: Plant wide Integrated Fire Alarm System

Life Cycle of the Control Systems Considered = 10 years

Escalation/Inflation Considered = None

Project Capital Cost

Design & Installation Cost for the Plant Wide Integrated Fire Alarm System

Estimated Study Phase Consultant Fee	$ 30,000	
Estimated Study Phase Force Account	$ 20,000	
Estimated Design Phase Consultant Fee	$ 400,000	
Estimated Design Phase Force Account	$ 100,000	
Estimated Construction Cost (Contractor)	$ 2,286,700	
Estimated Construction Phase Consultant Fee	$ 228,670	
Estimated Construction Phase Force Account	$ 180,000	
Project Cost	$ 3,245,370	(1)

Design/ Construction Period Interest

Considering 5 months Study & Design duration and 7 months Construction (Total n = 1.0)

Interest I = I*n*C = 0.07*1.0*3,245,370 = $ 227,176 (2)

Additional Annual Operation & Maintenance Cost

Operation Labor Cost	$ 50,000
Maintenance Labor Cost	$ 100,000
Equipment & Services Cost	$ 50,000
Energy Cost	$ 2,000
Hauling & Disposal Cost	$ 1,000
Cost of Material	$ 50,000
Annual O&M Cost	$ 253,000

Present Value P of O&M Cost

P=A(P/A,7%,10) (P/A = 7.0351) $ 1,779,880 (3)

Salvage Value

Assuming Present Salvage Value $ 0 (4)

Total Present Value (1)+(2)+(3)+(4) of 10 Year Life Cycle $ 5,252,426

GLWA ...rs Water Authority
...rovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1028

Project Title: **Plant-wide Fire Alarm Systems Upgrade/ Integration and Fire Protection Improvements** **Contract Number:**

Description: Install an integrated Fire Alarm system to facilitate centralized monitoring

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ - Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -							$ -
601997	Capital Allocation: Fringe Benefits	40%	-										-
601998	Capital Allocation: Nonpersonnel	5%	-										-
616900	Construction		-	$ 5,390		$ 601							5,991
617950	Contractual Engineering Service		-		-	$ 23							23
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 5,390	$ -	$ 624	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,014
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	5,390	-	624	-	-		-	-		6,014
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 5,390	$ -	$ 624	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,014

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$6,014	$0		$0	$0	$0	$0	$0	$6,014

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

New CIP 212001

DETROIT WATER AND SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
PROJECT PROPOSAL

Title: Secondary Clarifiers, RAS Pumps, and MCCs Improvements CIP # 1100

CIP: Sewerage

1. Problem Statement

The Wastewater Treatment Plant's infrastructure is aging and in need of rehabilitation. To address this issue, the Department recently went through a series of rehabilitation work throughout the plant. As a part of PC-744; WP 1025, Electrical Improvements; outdoor substations FT-1, FT-2, FT-3, and FT-4 are scheduled to be replaced in kind with new electrical equipment. PC-744, Needs Assessment Report, also recommends the replacement of the MCC at the secondary clarifier buildings. The MCCs are virtually in fair condition but are the same age as the substations' MCCs that feed the clarifiers' MCCs. In addition, the MCC manufacturers went out of business and replacement parts are not available. DWP-1025, Electrical Plant Wide Improvements, is scheduled to replace the substation equipment and associated MCCs that are supplying the electrical power to the secondary clarifiers' MCCs. It is also recommend that the replacement of the RAS pump, VFD and associated control and instrumentation shall be a part of the proposed work. This project is a part of the strategy to improve the quality and capacity of sewage treatment and secondary effluent.

2. History (Background)

DWSD Contract PC-720, Secondary Clarifies Improvements, has rehabilitated and replaced part of secondary clarifier's equipment. It is to be noted that the work related to Return Activated Sludge (RAS) pumps and associated equipment were part of PC-720 rehabilitation work but was deleted from the PC-720 contract due to unsatisfactory field performance.

3. Potential Alternative Solution

PC-744, Needs Assessment Study, recommends that all of the MCCs be replaced within a period of three to five years. It should be noted that additional work to replace each RAS pump on each secondary clarifier is planned in the near future. This task will take each clarifier out of service and would provide a good opportunity to replace these MCCs and minimize repeated shutdowns of the secondary clarifiers.

4. Operational Benefits of the Proposed Project

After completion of the rehabilitation, the secondary clarifiers would insure uninterrupted operation for the clarifiers.

ST S/D C

5. Financial Benefits of the Proposed Project

After replacement of the MCCs, pumps, and VFD at the secondary clarifier building, the secondary clarifier performance will improve and breakdowns would be minimized from the clarifiers being "out of service" thus avoiding any fines from the MDEQ Regulatory Agency. The proposed rehabilitation work would also keep the system stable and effluent within the NPDES permit limitations.

6. Preliminary Scope of Work:

- The preliminary scope of work involves as following:
- Provide new power supply cable to/from the secondary clarifiers and substation MCCs
- Complete all miscellaneous electrical work such as replacement of cables, conduit, pull boxes, panels and junction boxes, etc.
- Provide new MCCs at each secondary clarifier
- Provide short-circuit analysis and fault rating using EDSA software
- Provide detailed hydraulic analysis and sizing of the pumps related to secondary clarifiers RAS pumping
- Provide 25 (twenty-five) RAS pumps at the secondary clarifiers
- Provide enhanced training and operation and maintenance procedures to the plant operators
- Provide enhanced Operation and Maintenance Manuals

The work performed shall be in a manner such that normal operation of the WWTP is maintained at all times.

7. Related Projects Currently Underway or Planned

- DWP-1025, Electrical Plant Wide Improvements
- PC-754, Emergency Generators at WWTP
- PC-720, Secondary Clarifiers Improvement
- PC-744

8. Time Requirements

Following is our estimated time for each task

Phase	Start	Finish	Duration
Study/Design	08/01/2005	07/31/2006	12 Months
Construction	03/01/2007	02/28/2011	48 Months

Capital Improvement Program – Project Proposal
Title: Secondary Clarifiers RAS Pumps and MCCs Improvements

CIP 1100
New CIP 212001

9. Preliminary Cost Estimate:

DWSD Force Account Cost	$600,000.00
Consultant Service for Study/Design/Construction Assistance	$850,000.00
Construction Cost	$7,000,000.00
Total	$8,450,000.00
Say ☞	**$8,500,000.00**

10. Present Value/Life Cycle Cost Analysis:

Present Value calculated for 20-year life cycle of 25 RAS pumps and MCCs is $14,272,290.00. *See attached "Present Value/Life Cycle Cost Analysis Worksheet."*

11. Identification of In-House Responsibility:

The Wastewater Group will be responsible for the execution of this project; Plant Engineering will provide coordination.

Contact Person(s): Parvez S. Jafri, Wastewater Group (297-0200)
Sidney H. Bailey III, Plant Engineering (297-6471)

12. Reference Material

Needs Assessment Study (NAS) Rev. 5 done by DWP
PC-720

Submitted by: _____ **Date:** 3-28-05
Parvez S. Jafri, P.E.
Acting Head Engineer of Water Systems

Recommended by: _____ **Date:** _____

Approved by: _____ **Date:** 4/1/05
Gregory B. White, P. E.
Assistant Director - ESG

CIP PROJECT PROPOSAL

Present Value/Life Cycle Cost Analysis Worksheet

PROJECT TITLE: Secondary Clarifiers RAS Pumps and MCCs Improvements

Life Cycle of the equipment considered = 20 years
Escalation/inflation considered = None
Interested Rate = 7%

1. Project Capital Cost	
Estimates Study/Design Phase Consultant Fee	**$400,000.00**
Estimated Force Account Cost	**$600,000.00**
Estimated Construction Cost (Contractor)	**$7,000,000.00**
Estimated Construction Phase Consultant Fee	**$450,000.00**
Project Cost	**$8,450,000.00**
2. Design Construction Period Interest	
Considering 1 year Design Duration and 4 Year Construction (n=5)	**$1,478,750.00**
Interest I =i*0.5*n*PC	
3. Additional Annual Operation & Maintenance Cost:	
Operation Labor Cost	**$100,000.00**
Maintenance Labor Cost	**$50,000.00**
Equipment Services Cost	**$10,000.00**
Energy Cost	**$150,000.00**
Cost of Materials	**$50,000.00**
MDEQ Permit Requirement	**$50,000.00**
Annual O& M Cost	**$410,000.00**
Present Value P O & M Cost = $A*((1+i)^n-1/i*(1+i)^n)$	**$4,343,540.00**
P/A = 10.5940*O&M Cost	
4. Salvage Value	**$0.00**
Total Present Value (1+2+3+4) for 20-Year Period:	**$14,272,290.00**

CIP 1100

New CIP 212001

Capital Improvement Program - Secondary Clarifiers, RAS Pumps and MCCs Improvements

Expenditure Spread per Fiscal Years

Phase	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Study/Design	$100,000	$500,000	$350,000					**$950,000**
Construction				$2,500,000	$2,000,000	$1,750,000	$1,250,000	**$7,500,000**
								$8,450,000
								Say: $8,500,000

GLWA ...s Water Authority
...rovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1100

Project Title: **Returned Activated Sludge (RAS) Pumps, Influent Mixed Liquor System and Motor Control Centers (MCC) Improvements for Secondary Clarifiers**

Contract Number:

Description: Replace aging pump units, control and instrumentation and building enclosures

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ - Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -							$ -
601997	Capital Allocation: Fringe Benefits	40%	-										-
601998	Capital Allocation: Nonpersonnel	5%	-										-
616900	Construction		-	$ 24,060	-	$ 115							24,175
617950	Contractual Engineering Service		-		-	$ -							-
	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 24,060	$ -	$ 115	$ -	$ -	$ -	$ -	$ -	$ -	$ 24,175
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	24,060	-	115	-	-		-	-		24,175
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 24,060	$ -	$ 115	$ -	$ -	$ -	$ -	$ -	$ -	$ 24,175

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$24,175	$0		$0	$0	$0	$0	$0	$24,175

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No Date:
(circle applicable funding source): **Bond I&E** CMG

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

CIP 1117: Study, Design, & Construction Management Services for Modified Detroit River Outfall No. 2 - WRRF

No Proposal Available

Financial Page Follows

GLWA Water Authority
rovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1117

Project Title: **Study, Design, & Construction Management Services for Modified Detroit River Outfall No. 2 - WRRF** **Contract Number:**

Description: Provide remediation and decommissioning of non-utilized portions of as-built PC-709 construction, which resulted in a flooded tunnel

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** - Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ - Estimated Start Date*: Estimated Completion Date*:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -							$ -
601997	Capital Allocation: Fringe Benefits	40%	-										-
601998	Capital Allocation: Nonpersonnel	5%	-										-
616900	Construction		-	$ -	-	$ -							-
617950	Contractual Engineering Service		-	8,449	-	$ 33							8,482
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 8,449	$ -	$ 33	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,482

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-	8,449	-		33	-	-		-	-		8,482
Sewer I&E		-					-	-	-	-			-
	Project Total	$ -	$ 8,449	$ -	$ 33	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,482

PROJECTED (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$8,482	$0	$0	$0	$0	$0	$0	$8,482

0

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: 0 Date:

(circle applicable funding source): **Bond I&E** Yes No CMG

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA Great Lakes Water Authority

Project Title	**Repair Potable Water, Screened Final Effluent, natural Gas, and Compressed Air Pipelines at the WWTP (CIP 1140)**
Project Significance	These utilities are vital to the operations of the WWTP. The integrity of these systems is necessary to operate the WWTP reliably.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/29/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Sanjeev Mungarwadi	Engineering Manager	WWOG
	Sanjeev.mungarwadi@glwater.org		3132978819
CMG Rep	Monica Y Daniels	Manager	Wastewater
	Monica.daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Kenneth Singleton	Engineer	WWOG	313 297-9826	kenneth.singleton@glwater.org

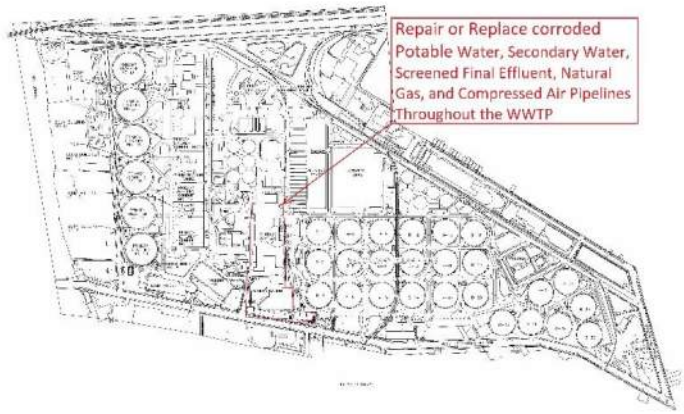
Site Name	Wastewater Treatment Plant
If Facility, Facility Address	9300 West Jefferson, Detroit MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	WWTP
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Multiple pipe lines such as Potable Water, Screened Final Effluent, Natural Gas, and Compressed Air Pipe lines at the WWTP are aging, getting corroded, leaking and failing at the WWTP



Repair or replace corroded Potable Water, Screened Final Effluent, Natural Gas, and Compressed Air Pipelines throughout the WWTP

Problem Statement	Multiple system pipe lines such as Potable Water, Screened Final Effluent, Natural Gas, and Compressed Air Pipe lines at the WWTP are aging, getting corroded, leaking and failing with frequent breaks and inadequate water pressure in numerous locations throughout the WWTP. The repair/replacement of affected pipes, fittings and valves is required to prevent leakages and maintain fluid pressures in the plant. The compressed air is not available in the Pump Station #2 facility to supply the required air to the pneumatic tools. Multiple system pipe lines such as Potable Water, Screened Final Effluent, Natural Gas, and Compressed Air Pipe lines at the WWTP are aging, getting corroded, leaking and failing with frequent breaks and inadequate water pressure in numerous locations throughout the WWTP. The repair/replacement of affected pipes, fittings and valves is required to prevent leakages and maintain fluid pressures in the plant. The compressed air is not available in the Pump Station #2 facility to

	supply the required air to the pneumatic tools. Study for the secondary water system reliability and improve water pressure to the WWTP to start in 2017 as an emergency project.
History / Background	The affected multiple systems within the plant are comprised of pipes that range from 0.75 inch to 16 inches in diameter. The larger pipes are generally ductile iron and the smaller lines are copper/galvanized iron. These larger pipes make up a small portion of the multiple system and smaller pipes make up a majority of the distribution system. Some of the pipes have been inexistence since the plant was built and have been found on record dating back to 1938. As the plant has grown so have the systems. In general, the majority of the changes to the multiple systems occurred when the specific buildings or components to the plant were built or renovated.
Preliminary Scope of Work	The potable water supply to WWTP is experiencing low pressure problem. The study design and construction for the secondary water system improvements to improve reliability and water pressure to the WWTP ids required. Other tasks include repair/replace the aging and corroded pipes, valves and fittings for Potable Water Supply System. Repair/replace the aging and corroded pipes, valves and fittings for Natural Gas system. Repair/replace the aging and corroded pipes, valves and fittings for the SFE system. Repair/replace the aging and corroded pipes, valves and fittings for the Compressed Air System. Design and Install Compressed Air to supply the required air to the pneumatic tools in Pump Station #2.
Related projects currently underway or planned	i.e., This project is step 2 of RRO2, or associated with Work Request or Work Order XXXX.
Potential Challenges	Temporary air, water, natural gas system shutdowns may be required to perform the work.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File	Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	These support systems are required for the process equipment to be operable.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
General Facilities	B915281	Book Value	Rehab

Cost Estimate Source	Opinion Of Cost				
Date of Cost Estimate	8/8/2016	**Prepared By**	Wastewater Design Group	**Division**	Wastewater Operations

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, Const. Assist.	Not yet started	$50	$190	$400	$150	$100	$0	$0	$ 890	5 Year
Construction	Not yet started	$0	$500	$1500	$1000	$1110	$0	$0	$4,110	4 years
Year Totals		$ 50	$ 690	$1,900	$1,150	$1,210	$ 0	$ 0	**$5,000**	5 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
		$0	$0	$0	$0	$0	$0	$0	$ 0	
		$0	$0	$0	$0	$0	$0	$0	$ 0	
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Alternate to repair and rehabilitation is replacement in kind with new pipes.
Description of Alternative Evaluation	The replacement in kind with new pipe will be more expensive than the repair and rehabilitation.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Some components are passed their useful life (i.e 30-40 years)
2) Performance (Service Level / Reliability)	4	Some of the valves are badly corroded and difficult to operate with high probability of failure.
3) Regulatory (Environmental / Legal)	5	If the SFE pipes fail there is an immediate risk of non-compliance for air permits.
4) O&M	4	Significant O&M is required to keep the pipes and valves in operating condition.
5) Public Health & Safety	3	Permit violations would cause both air quality and water quality impacts.
6) Public Benefit	4	Public will benefit from improved air and water quality.
7) Financial	3	Exposure to multiple fines for permit violations.
8) Efficiency	4	Project will have a significant impact on efficiency of other equipment by keeping them in service.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	4	9.60	Numerous emergency repairs
2) Performance (Service Level / Reliability) 15%	4	3	9.00	Generally meets design needs but moderate risk
3) Regulatory (Environmental / Legal) 18%	5	3	10.80	Moderate risk and can be impactful
4) O&M 11%	4	3	6.60	25-49% reduction in reactive maintenance
5) Public Health & Safety 17%	3	2	6.80	Limited positive impact
6) Public Benefit 8%	4	2	3.20	Limited public benefit
7) Financial 10%	3	3	6.00	Moderate financial consequences if cancelled
8) Efficiency 9%	4	2	3.60	Improve operational efficiency
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**55.60**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	8/8/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Sanjeev Mungarwadi	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 216003

CIP #: 1140

Project Title: **Study/ Repair Potable Water, Screened Final Effluent, Natural Gas and Compressed Air Pipe Lines at the WRRF**

Contract Number:

Description: These utilities are vital to the operations of the WRRF. The integrity of these systems is necessary to operate the WRRF reliably.

Lead Division:

Division Leader:

Project Manager:

Phone:

Department Charged: Water X Sewage

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Both Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 4,950

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ -	-	$ -	$ 500	$ 1,500	$ 1,000	$ 1,110	$ -	$ -	4,110
617950	Contractual Engineering Service		-		-	$ 50	$ 190	$ 400	$ 150	$ 100	$ -	$ -	890
	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 50	$ 690	$ 1,900	$ 1,150	$ 1,210	$ -	$ -	$ 5,000
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	-	-	50	690	1,900	1,150	1,210	-		5,000
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ -	$ -	$ 50	$ 690	$ 1,900	$ 1,150	$ 1,210	$ -	$ -	$ 5,000

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$50	$690		$1,900	$1,150	$1,210	$0	$0	$5,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

1141

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
PROJECT PROPOSAL

Title: Rehabilitation of Rectangular Primary Clarifiers, drain lines, Hot water and scum lines

a. Rehabilitation of Rectangular Primary Clarifiers #5,6,7 & 8
b. Rehabilitation of the drain lines from Rectangular Primary Clarifiers # 3-12 to Oakwood Interceptor
c. Replacement of Hot Water and Scum Pipe lines between the Primary Scum Building and Scum incinerator Building

CIP: SEWERAGE (WWTP)

1. Problem Statement:

a. Main Collectors, Sludge cross collectors, speed reducers, motors, valves and associated electrical controls and switchgear in rectangular primary clarifiers 5, 6,7 and 8 are in constant use to treat the corrosive primary influent water, have corroded and are deteriorating. The concrete has developed cracks at various places and need to be repaired. The rehabilitation is required for a continuous reliable operation and meet the MDEQ and NPDES permit requirements.

b. Each pair of rectangular primary clarifiers has a 12" diameter drain pipes that drains by gravity to the Oakwood interceptor. During the year 2005, the drain pipes from clarifiers 1 and 2 collapsed.. Excessive corrosion of the 12-in drain pipes linking primary clarifiers 1 and 2 (Line# 1) caused wastewater from the pipe to leak into the ground and caused the ground to subside, resulting into a sinkhole. These pipes from clarifiers 1and 2 were replaced. A video investigation of the pipe (Line #1) showed the extent of damage. Further, a video investigation was carried out for the three remaining drain pipes (Line # 2-6) - linking primary clarifiers 3 and 4 (Line # 2), 5 and 6 (Line # 3), 7 and 8 (Line # 4) , 9 and 10 (Line # 5) , and 11and 12 (Line #6). The investigation showed that these remaining pipes are corroded, and these need to be rehabilitated immediately to maintain to improve the reliability of the drain system and to prevent the future collapsing causing enormous emergency repair cost.

c. The existing Perma - Pipe RICWIL pipe system consisting of 8 inch scum pipe, 4 inch hot water supply line with 18 inch steel conduit system between the primary scum buildings is leaking at various places due to the water lines breaks resulting into a unreliable operation and has deteriorated beyond repair. The deteriorating conditions of the RICWIL pipe system were identified during the preparation of Project Definition Statement for the New Scum Incinerator Building project, but were not addressed during the rehabilitation of New Scum Concentrator Building due to the budget constraints

Rehabilitation of Rectangular Primary Clarifiers - Continued

2. History (Background):

a. Rehabilitation of the primary rectangular clarifiers was performed under PC-651, PC-686, PC-700 and DWP-1015 .

Summary of Recent Rectangular Clarifier Rehabilitations		
Clarifier Nos.	**Contract No.**	**Rehabilitation Completion**
7 and 8	PC-651	1991
5 and 6	PC-686	1996
3, 4, 9, and 10	PC-700	1998
1, 2, 11, and 12	PC-700	1999
1-12	DWP-1015	2004

Contract PC-651, PC-686, PC-700 repaired the existing effluent weirs, troughs, new hanging hardware, furnishing and installing main collectors, cross collectors, speed reducers and motors. DWP-1015 replaced weirs and troughs for rectangular primary clarifiers 1-12. Main collectors, cross collectors, reducers, motors and valves for rectangular primary clarifiers 5, 6, 7 and 8 have not been rehabilitated since 1996.

b. These drain lines are 70 years old, corroded and are in deteriorating condition beyond repair. These drains are of 12" diameter and are located 30ft- 40 ft deep and these traverse an area containing numerous utilities, which are not clearly identified.

c. The existing Scum/ Hot Water piping system is about 30 years old ties into seven (1 -7) Scum Buildings to the Scum Incinerator Building. The hot water line is supplied by two boilers in the Scum Incinerator Building. The hot water is used for flushing and breaking up of scum deposits in the scum buildings. The heat from the water line helps to keep the scum from solidifying in the scum line. But there is no recirculation line to return the heated water to the boilers to flush the scum hoppers when needed These pipes are buried under ground. All joints of the 18 inch conduit pipe system are welded and pipes are separated by spacers.

3. Potential Alternative Solutions: Continue to operate at higher O&M cost or Replace / Rehab as below:

a. Replacement is needed for Main collectors, Sludge cross collectors, speed reducers, motors, valves and associated electrical controls and switchgear for rectangular primary clarifiers 5, 6,7, and 8 which have met and exceeded the life expectancy and are deteriorating.

b. Rehabilitation of the drains from rectangular primary clarifiers 3-12 is needed .The Insituform technique has been identified as the best method for restoring the pipe integrity. This consists of installing a resin-impregnated tube into the existing pipe to result in a seamless, joint less "pipe-within-a-pipe" with a smooth, continuous inner surface which usually increases flow capacity The sludge from each pair of tanks enters the pipes via a manhole on the south end of the pipe. A manhole must be constructed next to the south edge of the Oakwood so that the lining can be done between both manholes.

Rehabilitation of Rectangular Primary Clarifiers - Continued

c. Replacement of Hot Water and Scum Pipe line is the solution to this problem is to replace with a new Perma - pipe RICKWIL pipe system with 8 inch scum pipe, 4 inch hot water supply line and a new 2 inch hot water recirculation line enclosed in a 18 inch - 10 gauge steel conduit system.

4. Operational Benefits of Proposed Project:

a. Replacement of main collectors, sludge cross collectors, speed reducers, motors, valves, associated electrical controls and switchgear and concrete repair in rectangular primary clarifiers 5,6,7, and 8 will improve the operation reliability , prevent the shut down of clarifiers causing operational disruption and meet the MDEQ and NPDES permit requirements.

b. Rehabilitation of the drains from rectangular primary clarifiers 3-12 will improve the operation reliability and prevent the prolonged shut down of system causing operational disruption.

c. Replacement of Hot Water and Scum Pipe line between the primary scum buildings will improve the operation reliability of conveying scum to the Scum Incinerator Building and prevent the shut down of systems causing operational disruption.

5. Financial Benefits of Proposed Project:

a. Timely completion will result in efficient operation without disruption and will avoid the potential permit violations. This will extend the life of the main Collectors, speed reducers, motors valves, and associated electrical controls and switchgear for more than 20 years.

b. Timely completion will reduce the extensive future cost of replacing the entire drain system, and will result in reliable operation without disruption. The Rehabilitation of the drains will extend the life of the system by more than 20 years. **Note**: Addressing this problem now, will save future cost which will be much higher than the current rehabilitation cost.

c. New Ricwil pipe system will result in efficient operation and reduced extensive repairs to the system.

6. Preliminary Scope of Work:

a.

- Replacing Main Collectors, sludge cross collectors, speed reducers and motors and pivot base for each clarifier
- Replace switches, starters, and limit switches for 7 and 8 tanks
- Replace 12 inch and 16 inch drain valves at the manholes
- Repair approximately 4500 liners feet of Concrete cracks for each clarifier
- Driving unit concrete slabs for each main collector.
- Replace cantilever slabs for each clarifier
- Repair approximately 150 linear feet of crack in the pipe gallery for each clarifier
- Repair approximately 500 sq ft of concrete spall for each clarifier

Rehabilitation of Rectangular Primary Clarifiers - Continued

b.

- Rehabilitation of the drain line from rectangular primary clarifiers 3-12 Lining with insituform type
- Probe to locate the south edge of the Oakwood Interceptor.
- For each pipe, construct a new manhole close to the edge of the Oakwood to complement the one on the south end of the drain pipe.
- Line each pipe between the two manholes.
- Tie in the new manhole to the Oakwood.
- Undertake geotechnical investigation to determine soil profile at the location of each new manhole, taking care to avoid all underground utilities.
- Design earth retention system for the full depth of entry shaft.
- Provide engineering oversight services during construction.
- Construct appropriate entry shaft near the Oakwood for each drain pipe.
- Line pipe between manholes with Insituform
- Tie in each new manhole to Oakwood
- Construct new manhole in entry shaft and backfill any open excavation outside the manholes

c. The replacement of the system would include Perma -Pipe RICWIL Pipe System but not limited to the following:

- 8 inch Sch 40 Scum Pipe
- 4 inch Sch 40 hot water supply pipe
- 2 inch Sch 40 hot water return pipe
- 18 inch - 10 gauge steel conduit system
- Prefabricated in 40 ft length maximum
- Tie ins to seven (7) scum buildings
- Lateral , risers, offsets, cleanouts to grade
- Exterior coating of RICWIL Multi - therm 500 insulation
- Concrete trench with cover for the entire length of the pipe
- Excavate earth 2-3 ft deep to accommodate the concrete trench
- Excavate backfill and reseed.
- Demolish and remove existing pipe
- Keep existing system in operation during installation of new system

7. Related Work Currently Underway or Planned: DWP-1015, DWP-1092 , DWP-1038 PC-740, PC-757, PC-713

8. Time Requirements:

	Start	**Finish**	**Duration**
Study	Feb 28th, 2007	Aug 31st , 2007	6 months
Design	May 30th, 2008	March 31st ,2009	10 months
Construction	Nov 1st , 2009	May 31st , 2011	18 months

Rehabilitation of Rectangular Primary Clarifiers - Continued

9. Capital Cost Estimate: *" Itemized Costs are listed on the attached Capital Cost Estimate Worksheet."*

Study	$ 300,000
Design	$ 1,170,000
Construction	$ 15,970,359
Total (Say)	$ 17,500,000

CIP FISCAL YEAR EXPENDITURE PROJECTIONS

FY-2006-2007	FY-2007-2008	FY-2008-2009	FY-2009-2010	FY-2010-2011	TOTAL
200,000	270,000	1,000,000	7,500,000	8,530,000	17,500,000

10. Present Value/ Life Cycle Cost Analysis

Present Value Calculated for 20 years Life cycle for the tank is : **$22,667,988**

Equivalent Annual Cost of the project is: :**$2,139,698**

" See the attached "Present Value/ life Cycle Cost Analysis Worksheet. "

11. Identification of In-House Responsibility: WEG will be responsible for the execution of the project and WWTP- Facilities Engineering will provide coordination

Principal Contact	- Jared Richard,
WWTP- Facilities Engineering	- Joseph Akinmusuru
Maintenance	- Joseph Sagetti , Richard Shoven
Operations	- Bill Craft

12. Reference Materials: DWP-1070, DWP-1085, DWP-1092, DWP-1038 , PC-651, PC-686, PC-700, PC-757, Needs Assessment Rev-6

Submitted By: Kamlesh Kumar Date: 4/26/06

Kamlesh Kumar, P.E.

Sr. Associate Mechanical Engineer

Recommended By: Sidney H. Bailey III Date: 5/4/06

Sidney H. Bailey III, P.E.

Technical Advisor, WWTP

Approved: L Lieberman Date: 5/9/06

Louise Lieberman, P.E

Assistant Director of Wastewater Operations

INSTRUCTIONS: **Project Manager must input data in the blue cells.**
The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet
FOR "SELECTED" ALTERNATIVE

PROJECT TITLE: Rehabilitation of Rectangular Primary Clarifiers, drain lines, Hot water and scum lines

	Input Data Into Colored Boxes		Period Duration	Line Item #
Study Phase				
Consultant Fee	$250,000			
In-house Force Account	$50,000			
Sum Total of Study Phase		$300,000	0.5 yrs.	1
Design Phase				
Consultant Fee	$950,000			
In-house Force Account	$220,000			
Sum Total of Design Phase		$1,170,000	0.8 yrs.	2
Construction Phase				
Construction Cost				
Civil Items	$5,850,000			
Mechanical Items	$3,850,000			
Electrical Items	$670,000			
Miscellaneous *(Material Costs: wiring, etc.)*	$260,000			
Subtotal Sum	$10,630,000			3
Mobilization & Demobilization Costs: *(3% of Line Item# 3)*	$318,900			4
Subtotal *(Line Items# 3+4)*	$10,948,900			5
G.C./O.H./Profit: *(15% of Line Item# 5)*.....	$1,642,335			6
Subtotal *(Line Items# 5+6)*	$12,591,235			7
Provisionary/Contingency Allowance: *(10% of Line Item# 7)*	$1,259,124			8
Subtotal **Construction Cost** *(Line Items# 7+8)*	$13,850,359			9
Consultant Fee for Construction Assistance Services	$1,650,000			10
In-house Force Account for Construction Phase	$470,000			11
Sum Total of Construction Phase *(Line Items# 9+10+11)*		$15,970,359	1.5 yrs.	12
GRAND TOTAL CAPITAL COST ESTIMATE: *(Line Items# 1+2+12)* ...		$17,440,359	**2.8 yrs.**	13
		say ***$17,500,000***		

FY	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	Remaining	TOTAL
	$200,000	$2,170,000	$1,000,000	$8,900,000	$7,373,000		$17,500,000

For Information Only

ESTIMATED OPERATIONS AND MAINTENANCE COST NEEDED WITH THIS CONTRACT

(This O&M Amount Is Not Included In The Capital Cost Calculations Shown Above)

FY	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	Remaining	TOTAL
	$580,000	$580,000	$580,000	$580,000	$560,000		$2,880,000

Revised: *January 2006*

INSTRUCTIONS: Project Manager must input data in the blue cells.
The white cells are automatically calculated.

CIP PROJECT PROPOSAL

Present Value/Life Cycle Cost Analysis Worksheet FOR "SELECTED" ALTERNATIVE

PROJECT TITLE: Rehabilitation of Rectangular Primary Clarifiers, drain lines, Hot water and scum lines

(provide information in the blue shaded cells only. All other cells are auto-calculated)

Capital Cost "C"

Design & Installation Cost for the New Equipment			Line Item #
Estimated Study Phase Consultant Fee		$250,000	
Estimated Study Phase Force Account Cost		$50,000	
Estimated Design Phase Consultant Fee		$950,000	
Estimated Design Phase Force Account Cost		$220,000	
Estimated Construction Cost (Contractor)		$13,850,359	
Estimated Construction Phase Assistance Consultant Fee		$1,650,000	
Estimated Construction Phase Assistance Force Account Cost		$470,000	
Sum Total of "Present Value of Capital Cost" Items	**C =**	**$17,440,359**	**1**

Study, Design, and Construction Period interest Value "I"

Total Project Period: n_1 = **2.8** years *(this includes study, design, and construction phases)*

Interest Rate: **i =** **7.0** % per year

Present interest Value "I" = ($i*n_1*C)*.5$	**I =**	**$1,678,635**	**2**

Annual Operation & Maintenance Cost "A"

	New Equipment	Existing Equipment for Info Only
Operation Labor Cost	$90,000	$135,000
Maintenance Labor Cost	$75,000	$145,000
Equipment & Services Cost	$25,000	$55,000
Energy Cost	$120,000	$180,000
Hauling & Disposal Cost	$10,000	$20,000
Cost of Materials	$15,000	$45,000
Sum Total of "Annual O & M Cost" Items	**$335,000**	**$580,000**

Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(i*(1+i)^n))$ $P_{O\&M}$ = **$3,548,995** **3**

or P=A(P/A,i%,n_2) **where:** **i =** 0.07 *and* n_2 = **20** **yrs.**

See Table below for the n_2 years

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*

S = **$0** **4**

Total Present Value of Project of **20** **Year Life** = *(Line Items#1+2+3+4)* **P =** **$22,667,988** **5**

Equivalent Annual Cost of the Project "A" = $P*((I*(1+I)^n)/((1+i)^n-1))$ **A =** **$2,139,698** **6**

or A = P(A/P,7%,20)

Revised: *January 2006*

New CIP 211003

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1141

Project Title: **Rehabilitation of Primary Clarifiers** **Contract Number:**

Description: Rehabilitation to maintain NPDES permit capacity and addressing excessive, maintenance induced downtime

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 360 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ -	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
617950	Contractual Engineering Service		-	1	-	$ 220	$ 240	$ 120	$ -	$ -	$ -	$ -	581
	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 1	$ -	$ 220	$ 240	$ 120	$ -	$ -	$ -	$ -	$ 581
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	1	-	$ 220	$ 240	$ 120	$ -	$ -	$ -		581
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 1	$ -	$ 220	$ 240	$ 120	$ -	$ -	$ -	$ -	$ 581

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$221	$240		$120	$0	$0	$0	$0	$581

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

1144

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
PROJECT PROPOSAL (REVISED)

Title: Rehabilitation of Upper Level Belt Filter Presses for Complex II Dewatering

CIP: SEWERAGE

1. **Problem Statement.**
Belt Filter Presses (BFPs) of Complex II Dewatering at WWTP started encountering various operational problems and breakdowns. These problems are experienced mainly with their supportive equipment including, but not limited to: hydraulic skids, grinders, control valves, isolation valves, booster pumps and the main SFE Booster Pumps in the basement of C-II. The BFP units have also to be rebuilt as needed.
The Main Control Panel (MCP) monitoring and controlling Polymer feed and Sludge feed has voluminous hard wiring making it hard to troubleshoot. The individual BFP's Local Control Panels (LCPs) are corroded at the bottom and need refurbishment. Due to the uncertainty and complexity associated with current system's configuration and communication hardware, the control and monitoring functions were not configured and integrated with the main Ovation Control System.
A preparation for major refurbishment or replacement of existing equipment is necessary to ensure reliability and efficiency of this operation. These units are vital for the Plant to meet its mandated commitments to dewater the average daily capacity of 650 dry tons per day (dt/d), and a peak capacity of 940 (dt/d) by December 2007 under the current NPDES permit.

2. **History (Background)**
The Upper Level of Complex II Dewatering has 12 Belt Filter Presses with a total firm capacity of 352 dry tons per day. They were purchased under contract PC-690, installed under contract PC-691 and put in operation in the spring of 2000.

3. **Potential Alternative Solutions** None.
Rehab the 12 BFPs, and rehab/modify/replace all related supportive equipment, including control panels and associated wiring as necessary. This will improve the overall performance of the Presses and decrease the maintenance costs and efforts. It will also allow WWTP to meet the NPDES permit requirements. The continuation to repair failed equipment and components will decrease the efficiency and reliability of the BFPs and increase running costs.

4. **Operational Benefits of Proposed Project**
   A. Extend the service life and reliability of BFPs.
   B. Reduce operation cost of the units.
   C. Enable WWTP, meet the NPDES permit requirements.

5. **Financial Benefits of Proposed Project**
The rehabilitation of the BFPs will improve the efficiency of operation and result in reduced maintenance costs.

6. Preliminary Scope of Work

A. Study the existing BFPs System and make recommendations for any changes if necessary to improve it.

B. Modify/rehab/replace as per above recommendations the following Equipment: - 12 BFPs, Unit SFE Booster Pumps, Main SFE Booster Pumps and their related Valves, Sludge Grinders, Central Hydraulic Drives, Sludge Control Valves, Sludge Conditioning Tank & Valves, Polymer System, Electrical General Provisions, Electrical Devices.

C. Consolidate hard-wired functions and devices into Local PLCs, Main PLC and Panel Mounted HMIs similar to BFPs in Dewatering Complex I.

D. Duplicate all monitoring and/or control functions into the existing Ovation Controller and Ovation dual Operating Workstations.

7. Related Projects Currently Underway or Planned

A. Project DWP-1044: Rehabilitate Belt Filter Presses at Complex I Dewatering.

B. Project CS-1442: Incineration and Conveyance System Improvements.

C. Project DWP-1074 Central Offload Facility.

D. PC-713 Plant Wide Instrumentation

8. Time Requirements

	Start	Finish	Duration
Study	July1st. 2008	Oct. 31st. 2008	4 Months
Design	Aug.1st.2009	May.31st. 2010	10 Months
Construction	Feb.1st.2011	July.31st. 2012	18 Months

RFP for study preparation must begin on October 1st. 2007

9. Capital Cost Estimate

Study	$250,000
Design	$700,000
Construction	$9,450,000
Total	$10,400,000

FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012- 13	TOTAL
$250,000	$3,000,000	$4,250,000	$2,000,000	$900,000	$10,400,000

10. Present Value/Life Cycle Cost Analysis for Selected Alternatives

Present Value calculated for 20 years Life Cycle of Improvements is, $16,512,475
Equivalent Annual Cost of the Project is, $2,351,005

11. Identification of in-house Responsibility

Engineering Services will be responsible for the execution of this project. Plant Engineering and Solids Area Supervisory (SAS) Group will provide coordination.

Contact Person(s):

Ken Paylor Senior Foreman, WWTP (297-6423)
Delbert Walls, AHSPS Operations (297-5047)
Salman Abrou, Senior Associate Engineer, (297-5925).
Rao Manyam, Engineer of Water Systems (297-6446)
Bill Craft, Sewage Plant Supervisor (297-0275)

12. Reference Materials

DWSD Contract No. PC-690
DWSD Contract No. PC-691
DWSD Contract No. PC-713
Needs Assessment Study, Revision 6

Submitted by: - S. D. Abrou Date: 4/26/06

Salman Abrou, PE
Sr. Associate Mech. Engineer

Recommended by: S H Bailey III Date: 5/4/06

Sidney H Bailey III, PE
Technical Advisor, WWTP

Approved by: L Lieberman Date: 5/10/06

Louise Lieberman, PE
Assistant Director of Wastewater Operations

CIP 1144

New CIP 213001

INSTRUCTIONS: **Project Manager must input data in the blue cells.**
The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet
FOR "SELECTED" ALTERNATIVE

PROJECT TITLE: Rehabilitation of Upper Level Belt Filter Presses for Complex II Dewatering

Input Data Into Colored Boxes

			Period Duration		Line Item #
Study Phase					
Consultant Fee	$200,000				
In-house Force Account	$50,000				
Sum Total of Study Phase		$250,000	0.3	yrs.	1
Design Phase					
Consultant Fee	$600,000				
In-house Force Account	$100,000				
Sum Total of Design Phase		$700,000	0.7	yrs.	2
Construction Phase					
Construction Cost					
Civil Items	$110,000				
Mechanical Items	$4,800,000				
Electrical Items	$2,050,000				
Miscellaneous *(Material Costs: wiring, etc.)*	$30,000				
Subtotal Sum	$6,990,000				3
Mobilization & Demobilization Costs: *(3% of Line Item# 3)*	$209,700				4
Subtotal *(Line Items# 3+4)*	$7,199,700				5
G.C./O.H./Profit: *(15% of Line Item# 5)*	$1,079,955				6
Subtotal *(Line Items# 5+6)*	$8,279,655				7
Provisionary/Contingency Allowance: *(10% of Line Item# 7)*	$827,966				8
Subtotal **Construction Cost** *(Line Items# 7+8)*	$9,107,621				9
Consultant Fee for Construction Assistance Services	$280,000				10
In-house Force Account for Construction Phase	$67,000				11
Sum Total of Construction Phase *(Line Items# 9+10+11)*		$9,454,621	1.5	yrs.	12
GRAND TOTAL CAPITAL COST ESTIMATE: *(Line Items# 1+2+12)*		$10,404,621	**2.5**	**yrs.**	13
		say ***$10,400,000***			

FY	2008-09	2009-10	2010-11	2011-12	2012-13	Remaining	TOTAL
	$250,000	$3,000,000	$4,250,000	$2,000,000	$900,000	$0	$10,400,000

For Information Only

ESTIMATED OPERATIONS AND MAINTENANCE COST NEEDED WITH THIS CONTRACT

(This O&M Amount Is Not Included In The Capital Cost Calculations Shown Above)

FY	2008-09	2009-10	2010-11	2011-12	2012-13	Remaining	TOTAL
	$800,000	$800,000	$800,000	$800,000	$800,000		$4,000,000

CIP 1144

New CIP 213001

INSTRUCTIONS: Project Manager must input data in the blue cells.
The white cells are automatically calculated.

CIP PROJECT PROPOSAL

Present Value/Life Cycle Cost Analysis Worksheet FOR "SELECTED" ALTERNATIVE

PROJECT TITLE: Rehabilitation of Upper Level Belt Filter Presses for Complex II Dewatering

(provide information in the blue shaded cells only. All other cells are auto-calculated)

Line Item #

Capital Cost "C"

Design & Installation Cost for the New Equipment

Estimated Study Phase Consultant Fee	$200,000
Estimated Study Phase Force Account Cost	$50,000
Estimated Design Phase Consultant Fee	$600,000
Estimated Design Phase Force Account Cost	$100,000
Estimated Construction Cost (Contractor)	$9,107,621
Estimated Construction Phase Assistance Consultant Fee	$280,000
Estimated Construction Phase Assistance Force Account Cost	$67,000

Sum Total of "Present Value of Capital Cost" Items **C =** **$10,404,621** 1

Study, Design, and Construction Period Interest Value "I"

Total Project Period: n_1 = 2.5 years *(this includes study, design, and construction phases)*

Interest Rate: i = 7.0 % per year

Present Interest Value "I" = ($i*n_1*C$)*.5 **I =** **$910,404** 2

Annual Operation & Maintenance Cost "A"

	New Equipment	Existing Equipment for Info Only
Operation Labor Cost	$180,000	$200,000
Maintenance Labor Cost	$100,000	$200,000
Equipment & Services Cost	$50,000	$20,000
Energy Cost	$60,000	$75,000
Hauling & Disposal Cost	$250,000	$250,000
Cost of Materials	$100,000	$120,000

Sum Total of "Annual O & M Cost" Items $A_{O\&M}$ = $740,000

Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(i*(1+i)^n)$) $P_{O\&M}$ = **$5,197,450** 3

or P=A(P/A,i%,n_2) **where:** i = 0.07 *and* n_2 = 10 yrs.

See Table below for the n_2 years

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*

S = $0 4

Total Present Value of Project of 10 **Year Life** = *(Line Items#1+2+3+4)* **P =** **$16,512,475** 5

Equivalent Annual Cost of the Project "A" = $P*((i*(1+I)^n)/((1+i)^n-1))$ **A =** **$2,351,005** 6

or A = P(A/P,7%,20)

Revised: *January 2006*

PAGE 2

GLWA ...s Water Authority
...rovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213001

CIP #: 1144

Project Title: **Replacement of Belt Filter Presses for Complex I and Upper Level Complex II**

Contract Number:

Description: Study, design and construction assistance of equipment experiencing numerous breakdowns and for meeting permit capacities

Lead Division:

Division Leader:

Project Manager:

Phone:

Department Charged: Water X Sewage Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ -

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ 27	-	$ 1,776	$ -	$ -	$ -	$ -	$ -	$ -	1,803
617950	Contractual Engineering Service		-	2	-	$ 96	$ -	$ -	$ -	$ -	$ -	$ -	98
	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 29	$ -	$ 1,872	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,901
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	29	-	$ 1,872	$ -	$ -	$ -	$ -	$ -		1,901
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 29	$ -	$ 1,872	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,901

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$1,901	$0		$0	$0	$0	$0	$0	$1,901

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
Project Proposal

Title: **Grit and Screening Handling System Improvements for Pump Station #1 & 2**

CIP: **SEWERAGE (WWTP)**

1. **Problem Statement**
The installed Grit and Screening handling system needs modifications to meet performance requirements once the Synagro Contract reaches it's commercial operating period. The installed inclined screw conveyor from the basement to the mezzanine floor is not capable of handling the real time grit and screening load. Due to the constant operational problems the screening serpentine belt conveyor system needs to be replaced with the flat conveyor system. Bar screens and the collection buckets and the wear shoes have lived their useful life. The Grit Collection and Transport System needs modifications at Pump Station #1 and #2. The modified and rehabilitated system will improve reliability and efficiency of operation.

2. **History (Background)**
The Grit and Screening handling system and Grit Crane system -were installed under PC-744 projects DWP-1007 and DWP 1006. Rehabilitation of PS-1 bar screens # 1, 3, 5, 7, and 8 was performed during 1969 and on # 2 and #6 during 1989. The grit collection system was rebuilt in 1976. All of the buckets were rebuilt in 1976. The modification and the replacement of this equipment is required to assure reliable and efficient operation. This will allow WWTP to convey the additional load of the sludge hauling arrangements with Synagro Company and to meet MDEQ and other regulatory agencies requirements.

3. **Potential Alternative Solutions (Project Objective)**
The project objective is to modify and rehabilitate the Grit and Screenings Handling System, rehabilitate the screening belt conveyor system, rehabilitate the Bar Screens and Collection Buckets.

4. **Operational Benefits of Proposed Project**
Modifications and Rehabilitation of the Grit and Screening handling system, Rehabilitation of screening belt conveyor system, Rehabilitation of Bar screens and collection buckets will provide reliable operation, reduced maintenance, operational flexibility and less down time and meet MDEQ and other regulatory agencies requirements.

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
Project Proposal

Grit and Screening Handling System Improvements for Pump Station #1and #2 Continued:

5. **Financial Benefits of Project Proposal**

Modifications and rehabilitation of the system will result in efficient operation and reduced maintenance costs. Timely completion of this project will also avoid potential penalties by MDEQ and other regulatory agencies. Emergency. replacement work, should it be required, will require paying a premium cost to accelerate equipment procurement.

6. **Preliminary Scope of Work**

Study the current Grit Collection & Transport system for Pump Station #1 & 2
Provide alternates per then current requirements with recommendations
Demolish the current grit and screening conveyor system
Demolish serpentine belt conveyor system
Demolish the current bar screens and buckets.
Design and install the Grit and Screening conveyor system, bar screens, buckets wear shoes, and chains etc.

7. **Related Projects Currently Underway or Planned**

The coordination during construction and shut down must be done with the following projects.

CIP-291/ IH-104	- Improvements to Rectangular Clarifiers, Rehab of Scum Collector System.
CIP -1141	-Rehabilitation of Primary Clarifiers, Drain Lines, Hot Water and Scum Lines.

8. **Time Requirements**

	Start	Finish	Duration
Study	Dec 31st, 2008	June 30th, 2009	6 Months
Design	Nov 1st, 2009	August 31st, 2010	9 Months
Construction	Feb1st, 2011	August 31st, 2012	18 Months

9. **Capital Cost Estimate**

Study	$325,000
Design	$1,180,000
Construction	$16,095,000
Total	**$17,600,000**

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
Project Proposal

Grit and Screening Handling System Improvements for Pump Station # 1 &# 2 Continued:

CIP FISCAL YEAR EXPENDITURES PROJECTIONS

FY 2008-2009	FY 2009-2010	FY 2010-2011	FY 2011-2012	FY 2012-2013	FY 2013-2014
$325,000	$1,000,000	$180,000	$5,800,000	$9,200,000	$1,095,000

10. **Present Value / Life Cycle Cost Analysis**
Present value calculated for 20 years expected Life of the Grit and Screening System is $ 22,902,694.00. See the attached "Present Value/ Life Cycle Cost analysis Worksheet"

11. **Identification of In-House Responsibility**
Wastewater Design Group - Study and Design
Wastewater Construction Group -Construction-
WWTP - Plant Input, Review and Approval of the Project and Mile Stones
WWTP- Operations Contact Persons: Jared Richards, Darryl Chad Ivory
WWTP -Operation Technical Group Contact Person- Ken Singleton

12. **Reference Materials**
DWP 1007, DWP-1006, Need Assessment Rev-8

Submitted By: _____ **Date:** 03/17/08
Kamlesh Kumar, P.E.
Sr. Associate Mechanical Engineer

Recommended By: _____ **Date:** 3-17-08
Sidney H Bailey III, P.E.
Head Engineer

Approved By: _____ **Date:** 3/17/08
Stephen Kuplicki, P.E.
Assistant Director, Wastewater Operations

Attachments: 1.Capital Cost Estimate
2. Present Value/ Life Cycle Cost Analysis Worksheet

INSTRUCTIONS: **Project Manager must input data in the blue cells.** The white cells are automatically calculated.
COMPLETE THIS PAGE FIRST BEFORE INPUTTING DATA ON PAGE 2

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet

PROJECT TITLE: Grit and Screening Handling System Improvements for Pump Station #1 & 2

	Input Data Into Colored Boxes		Period Duration	Line Item #
Study Phase				
Consultant Fee	$275,000			
In-house Force Account	$50,000			
Sum Total of Study Phase		$325,000	0.5 yrs.	1
Design Phase				
Consultant Fee	$970,000			
In-house Force Account	$210,000			
Sum Total of Design Phase		$1,180,000	0.8 yrs.	2
Construction Phase				
Construction Cost				
Civil Items	$4,589,000			
Mechanical Items	$4,986,500			
Electrical Items	$680,000			
Miscellaneous *(Material Costs: wiring, etc.)*	$289,000			
Subtotal Sum	$10,544,500			3
Mobilization & Demobilization Costs:				
(3% of Line Item# 3)	$316,335			4
Subtotal *(Line Items# 3+4)*	$10,860,835			5
G.C./O.H./Profit: *(15% of Line Item# 5)*.....	$1,629,125			6
Subtotal *(Line Items# 5+6)*	$12,489,960			7
Provisionary/Contingency Allowance:				
(10% of Line Item# 7)	$1,248,996			8
Subtotal **Construction Cost** *(Line Items# 7+8)*	$13,738,956			9
Consultant Fee for Construction Assistance Services	$1,750,000			10
In-house Force Account for Construction Phase	$560,000			11
Sum Total of Construction Phase *(Line Items# 9+10+11)*		$16,048,956	1.5 yrs.	12
GRAND TOTAL CAPITAL COST ESTIMATE: *(Line Items# 1+2+12)* ...		$17,553,956	**2.8 yrs.**	13
		say ***$17,600,000***		

FY	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	Remaining	TOTAL
	$325,000	$1,000,000	$180,000	$5,800,000	$9,200,000	$1,095,000	$17,600,000

For Information Only

ESTIMATED OPERATIONS AND MAINTENANCE COST NEEDED WITH THIS CONTRACT

(This O&M Amount Is Not Included In The Capital Cost Calculations Shown Above)

FY						Remaining	TOTAL

Revised: *January 2008*

INSTRUCTIONS: **Project Manager must input data in the blue cells.**
The white cells are automatically calculated.

CIP PROJECT PROPOSAL

Present Value/Life Cycle Cost Analysis Worksheet

PROJECT TITLE: Grit and Screening Handling System Improvements for Pump Station #1 & 2

(provide information in the blue shaded cells only. All other cells are auto-calculated)

Capital Cost "C"

Design & Installation Cost for the New Equipment

		Line Item #
Estimated Study Phase Consultant Fee	$275,000	
Estimated Study Phase Force Account Cost	$50,000	
Estimated Design Phase Consultant Fee	$970,000	
Estimated Design Phase Force Account Cost	$210,000	
Estimated Construction Cost (Contractor)	$13,738,956	
Estimated Construction Phase Assistance Consultant Fee	$1,750,000	
Estimated Construction Phase Assistance Force Account Cost	$560,000	
Sum Total of "Present Value of Capital Cost" Items	**C = $17,553,956**	**1**

Study, Design, and Construction Period Interest Value "I"

Total Project Period: n_1 = **2.8** years *(this includes study, design, and construction phases)*

Interest Rate: i **7.0** % per year

Present Interest Value "I" = ($I*n_1*C$)*.5 **I = $1,720,288** **2**

Annual Operation & Maintenance Cost "A"

	New Equipment	Existing Equipment for Info Only
Operation Labor Cost	$92,000	$142,000
Maintenance Labor Cost	$76,000	$153,000
Equipment & Services Cost	$24,500	$56,000
Energy Cost	$123,000	$179,000
Hauling & Disposal Cost	$11,000	$23,000
Cost of Materials	$16,000	$46,000
Sum Total of "Annual O & M Cost" Items	$A_{O\&M}$ = $342,500	

Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(I*(1+I)^n))$ $P_{O\&M}$ = **$3,628,450** **3**

or P=A(P/A,i%,n_2) **where:** i = 0.07 *and* n_2 = **20** **yrs.**

See Table below for the n_2 years

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*

S = **$0** **4**

Total Present Value of Project of 20 Year Life = *(Line Items#1+2+3+4)* **P = $22,902,694** **5**

Equivalent Annual Cost of the Project "A" = P*((I*(1+i)^n)/((1+I)^n-1)) **A = $2,161,852** **6**

or A = P(A/P,7%,20)

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 211004

CIP #: 1189

Project Title: **Pump Station 1 Rack & Grit and MPI Sampling Station 1 Improvements** **Contract Number:**

Description: Rehabilitate aging rack and grit system for efficient removal of grit to reduce loading on downstream process areas

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 5,304 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	13,887	-	$ 2,303	$ 2,652	$ 2,652	$ -	$ -	$ -	$ -	21,494
617950	Contractual Engineering Service		-		-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 13,887	$ -	$ 2,303	$ 2,652	$ 2,652	$ -	$ -	$ -	$ -	$ 21,494

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-	$ 13,887	$ -	$ 2,303	$ 2,652	$ 2,652	$ -	$ -	$ -	$ -		21,494
Sewer I&E		-					-	-	-	-			-
	Project Total	$ -	$ 13,887	$ -	$ 2,303	$ 2,652	$ 2,652	$ -	$ -	$ -	$ -	$ -	$ 21,494

PROJECTED (000)

(000)	FY 2016-17 and prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$16,190	$2,652	$2,652	$0	$0	$0	$0	$21,494

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: [ ] Yes [0] No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

(9)

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM
PROJECT PROPOSAL

CIP# 1194

Title: Aeration System Improvements

I. Oxygen Baffle on Bay 10 of A1 & A2 Decks.
II. Isolation gate Repair/ Replacement (RAS - Deck 3 and 4)
III. Replace RAS and influent existing magmeters for ILP# 3,4 & 7
IV. Replacement of Influent Gates and Operators on Aeration Basin No.1 and 2

CIP: SEWERAGE (WWTP)

1. Problem Statement:

I. Basins #1 and 2 discharge weirs creates turbulence that causes entrained gas bubbles in the basins' effluent. The entrained gas bubbles cause excessive oxygen use for this process. Therefore a baffle to enclose the gas space inside these basins prior to the effluent weir is desired.

II. Aeration Basins #1, 2, 3, and 4 have been rehabilitated under DWP 1005. However, the rehabilitation of the Influent and RAS piping network and valves was not included in the scope of work for this project due to the budget constraint. The Influent and RAS pipeline system has been in service for over 25 years. The WWTP staff has recently repaired several pipeline leaks. Due to corrosion and constant deterioration pipeline valves are not seating properly which is causing additional equipment shutdowns which reduces the process capacity to perform repairs. These two conditions require that the RAS piping/valves be inspected and appropriate rehabilitation performed.

III. The existing influent and RAS magmeters on basins #3 and 4 are more than 20 years old and the replacement parts are not available. Three (3) - 48" magmeters on the discharge side of ILP# 7 are old and need parts for replacement. The manufacturer does not support these magmeters. These magmeters have exceeded the expected service life. The replacement of these magmeters is required to ensure accurate determination of the treated wastewater.

IV. These sluice gate/actuator assemblies have been in service in access of 20 years and have completed their expected useful life. Sluice gate 2G01A malfunctioned and maintenance efforts to repair this gate weren't successful. During a PC-744 rehabilitation subcontract, the 2G02A & 2G02B wedges failed and the stem on 2G02A was bent. Sluice Gate 2G02A of Aeration Deck #2 could not be operated because the actuator kicked out due to the high torque requirements to open the gate. This has resulted in unreliable operation and has become difficult to maintain the old gates and operators. An early replacement of the defective equipment is required to maintain and obtain reliable operation of the influent sluice gates for Aeration Decks #1& 2 which will improve system reliability and efficiency of the operation.

Aeration System Improvements Continued:

2. History (Background):

I. Rehabilitation of Aeration Basin #1 was completed under DWP 1005 in 2004. During start-up/testing of this basin, excessive oxygen was used in the process. The vendor & consultant investigated this situation and determined that the discharge weir creates turbulence that causes entrained gas bubbles in the basins' effluent. They recommended to partially close the discharge gates to inhibit entrained gas bubbles from leaving the basin. This technique was tested and the basin's performance improved to an acceptable level. O&M staff are concerned that partially closing the sluice gates will cause premature gate/actuator failure.

II. The Influent and RAS pipeline/ valves for the Aeration Basins have exceeded their expected service life, >25 years. The plant performed several repairs patching holes in the lines. There is over a ½ mile of RAS piping on plant site, which range from 2 feet to 8 feet in diameter. It would be prudent to perform a through inspection and rehabilitation / replacement of malfunctioning valves and corroded & deteriorating pipelines.

III. The Fisher/Porter supplied the original magmeters for aeration basins #3 & 4 during 1991. New converters/electronic modules were retrofitted to the existing magmeters. ABB purchased Fisher/Porter and terminated support of these magmeters, so the spare parts are not available.

IV. Sluice Gates 2G01A and 2G01B became difficult to operate starting in the summer of 2006. These gates as well as gates 2G02A and 2G02B on Aeration Deck #2 have repeatedly malfunctioned. The replacement of this equipment is required to obtain reliable operation of Aeration Decks #1& 2.

3. Potential Alternative Solution:

I. A baffle is to be added to the Aeration Basin #1. The gas space in the Aeration Basin#1 is to be sealed which would make it possible to pressurized the basin Partially close the discharge gates to inhibit entrained gas bubbles from leaving the basin, this technique was tested and the basin's performance improved to an acceptable level. However plant O&M staff are concerned that partially closing the sluice gates will cause premature gate/actuator failure.

II. Replacement / Rehabilitation of the Influent and RAS valves and pipeline.

III. Installation of new influent and RAS magmeters supporting current technology.

IV. Reconditioning the gate disks, straighten stems, and rebuilding the actuators is a temporary alternative to replacing the actuator/gate assemblies.

4. Operational Benefits of Proposed Project:

I. A pressurized basin would increase the efficiency of oxygen dissolving into the liquid. The baffle in the last bay would stop the oxygen from leaking into the discharge chamber without the risk of premature sluice gate failure.

Aeration system Improvements Continued:

II. Replacement /rehabilitation of the Influent and RAS valves / pipeline would enable the plant to comply with the NPDES permit. This would provide additional flexibility to schedule inspections and repair of the equipment without jeopordising processing capabilities.

III. Installing new influent and RAS magmeters would provide accurate data of the wastewater being treated during secondary operation to comply with the NPDES permit. This would also minimize the risk of an instrument failure causing an extended basin shutdown.

IV. Replacement of these gates will provide reliable operation, reduced maintenance, operational flexibility and less down time. The replacement of these gates must be coordinated with the project-Aeration System Improvements - CIP-1143

5. Financial Benefits of Proposed Project:

I. The addition of a baffle in Aeration Basin #1 would result in an increased efficiency of the oxygen used in the HPO activated sludge process. This would reduce the cost of oxygen being purchased from Praxair Inc.

II. Replacement / Rehabilitation of Influent and RAS valves and pipeline would improve the integrity of the activated sludge process and minimize the risk of a process shutdown to perform repairs saving O and M cost.

III. Installing new influent and RAS magmeters would provide accurate data of the wastewater being treated during secondary operation to comply with the NPDES permit. This would also minimize the risk of an instrument failure causing an extended basin shutdown thus saving O and M cost.

IV. Timely replacement of this equipment prior to a critical failure will enable DWSD to have this task performed at nominal cost. Emergency replacement work will require paying a premium cost to accelerate equipment procurement.

6. Preliminary Scope of Work:

I. Design and construct a gas space baffle for aeration basins #1 and 2 in bay 10. The baffle shall span the width of bay 10, and extend from the ceiling adequately to seal the headspace of these basins from the discharge weir. This project shall include relocating all require instruments, piping, and utilities so that the process can perform normally.

II. Inspect, design, and replace/rehabilitate the Influent piping and flow meters to aeration basins # 3 & 4. Inspect, design, and rehabilitate the RAS pipeline/valves/flow meters for the entire RAS pipeline network.

III. Design and install the influent and RAS magmeters for ILP #3&4 and 3 (three) 48"magmeters on the discharge of ILP # 7.

Aeration System Improvements Continued:

IV. Remove the existing Gates and operators, Study, Design, Purchase and install actuator/sluice gate assemblies for 2G02A & 2G02B on Aeration Deck #2. In addition study, design, purchase and install electric sluice gate actuators for sluice gates 2G01A & 2G01B for Aeration Deck # 1.

7. Related Projects Completed, Currently Underway or Planned

DWP- 1005 Aeration Deck Conversion and Improvements, The rehabilitation of Complex B (DWP – 1016)

Aeration Improvements Continued:

8. Time Requirements

	Start	Finish	Duration
Study	December 1, 2008	June 1, 2009	6 months
Design	June 2, 2009	March 1, 2010	9 months
Construction	September 6, 2010	September 6, 2012	24 months

9. Preliminary Cost Estimate

Study	$ 335,000
Design	$ 1,055,000
Construction	$23,810,000
Total	$25,200,000

CIP FISCAL YEAR EXPENDITURES PROJECTIONS

FY2008-2009	FY2009-2010	FY2010-2011	FY2011-2012	FY2012-2013	Total
$335,000	$1,200,000	$5,000,000	$11,800,000	$6,865,000	$25,200,000

Present Value/Life Cycle Cost Analysis
Present value calculated for 20 year expected Life of Aeration Improvement is $54,933,100
Equivalent Annual Cost of the Project A=$ 5,185,296
See the attached "Present Value / Life Cycle Cost analysis Worksheet"

10. Identification of in-house Responsibility

Study: WWTP- Facilities Engineering Group and Process Engineering
Design : WWTP Engineering Group.
Construction: Wastewater Construction Group will be responsible for the execution of the construction phase of this project.
Contact persons:
Jared Richards: WWTP General Superintendent – Operation
Darryl Chad Ivory: WWTP Assistant Sewage Plant Operations Superintendent
Pawan Wadehra : WWTP Process Engineering

11. Reference material:

DWP-1005, Needs Assessment Rev-5 & Rev-6

Submitted by: Ravikara Shiravanthe Date: 4-17-08
(MH)
Ravikara Shiravanthe, PE.
Sr. Associate Mechanical Engineer, WWDG

Recommended by: Date: 4-18-08
Parvez Jafri, P.E
Head Engineer, WWDG

Approved by: R Shukla Date: 4/25/08
Ramesh C. Shukla, P.E
Assistant Director, Engineering Services

New Scope of Work:

The work includes study, design and installation of gas space baffle for aeration basins Nos. 1 & 2 in Bay10, replacement of influent, RAS piping and valves for Decks# 3&4, replace RAS & influent magmeters for ILP Nos 3,4, &7. This project also includes removal of existing gates and operators, study, design, purchse and installation of actuators/sluice gate assemblies for 2G02A & 2G02B on Aeration deck#2 and electric sluice gate actuators for sluice gates 2G021A & 2G01B for Aeration Deck #1

Milestones

	Start	Finish	Duration
Study	December 1, 2008	June 1, 2009	6 months
Design	June 2, 2009	March 1, 2010	9 months
Construction	September 6, 2010	September 6, 2012	24 months

Projected Expenditure for Aeration System Improvements

FY	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	Remaining	TOTAL
S/D/C	$335,000	$1,200,000	$5,000,000	$11,800,000	$6,865,000		$25,200,000

INSTRUCTIONS: **Project Manager must input data in the blue cells.** The white cells are automatically calculated.
COMPLETE THIS PAGE FIRST BEFORE INPUTTING DATA ON PAGE 2

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet

PROJECT TITLE: Aeration System Improvements

	Input Data Into Colored Boxes		Period Duration	Line Item #
Study Phase				
Consultant Fee	$280,000			
In-house Force Account	$55,000			
Sum Total of Study Phase		$335,000	0.5 yrs.	1
Design Phase				
Consultant Fee	$940,000			
In-house Force Account	$215,000			
Sum Total of Design Phase		$1,155,000	0.8 yrs.	2
Construction Phase				
Construction Cost				
Civil Items	$5,550,000			
Mechanical Items	$8,390,000			
Electrical Items	$2,500,000			
Miscellaneous *(Material Costs: wiring, etc.)*	$1,060,000			
Subtotal Sum	$17,500,000			3
Mobilization & Demobilization Costs:				
(3% of Line Item# 3)	$525,000			4
Subtotal *(Line Items# 3+4)*	$18,025,000			5
G.C./O.H./Profit: *(15% of Line Item# 5)*.....	$2,703,750			6
Subtotal *(Line Items# 5+6)*	$20,728,750			7
Provisionary/Contingency Allowance:				
(10% of Line Item# 7)	$2,072,875			8
Subtotal **Construction Cost** *(Line Items# 7+8)*	$22,801,625			9
Consultant Fee for Construction Assistance Services	$600,000			10
In-house Force Account for Construction Phase	$280,000			11
Sum Total of Construction Phase *(Line Items# 9+10+11)*.....		$23,681,625	2.0 yrs.	12
GRAND TOTAL CAPITAL COST ESTIMATE: *(Line Items# 1+2+12)* ...		$25,171,625	**3.3 yrs.**	13
		say ***$25,200,000***		

FY	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	Remaining	TOTAL
	$335,000	$1,200,000	$5,000,000	$11,800,000	$6,865,000		$25,200,000

For Information Only
ESTIMATED OPERATIONS AND MAINTENANCE COST NEEDED WITH THIS CONTRACT
(This O&M Amount Is Not Included In The Capital Cost Calculations Shown Above)

FY						Remaining	TOTAL

Revised: *January 2008*

INSTRUCTIONS: **Project Manager must input data in the blue cells.**
The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Present Value/Life Cycle Cost Analysis Worksheet

PROJECT TITLE: Aeration System Improvements

(provide information in the blue shaded cells only. All other cells are auto-calculated)

Capital Cost "C"

Design & Installation Cost for the New Equipment

		Line Item #
Estimated Study Phase Consultant Fee	$280,000	
Estimated Study Phase Force Account Cost	$55,000	
Estimated Design Phase Consultant Fee	$940,000	
Estimated Design Phase Force Account Cost	$215,000	
Estimated Construction Cost (Contractor)	$22,801,625	
Estimated Construction Phase Assistance Consultant Fee	$600,000	
Estimated Construction Phase Assistance Force Account Cost	$280,000	
Sum Total of "Present Value of Capital Cost" Items	**C = $25,171,625**	**1**

Study, Design, and Construction Period Interest Value "I"

Total Project Period: n_1 = 3.3 years *(this includes study, design, and construction phases)*

Interest Rate: i = 7.0 % per year

Present Interest Value "I" = ($I*n_1*C)*.5$	**I = $2,863,272**	**2**

Annual Operation & Maintenance Cost "A"

	New Equipment	Existing Equipment for Info Only
Operation Labor Cost	$275,000	
Maintenance Labor Cost	$533,000	
Equipment & Services Cost	$155,000	
Energy Cost	$85,000	
Hauling & Disposal Cost	$251,000	
Cost of Materials	$1,240,000	
Sum Total of "Annual O & M Cost" Items	$A_{O\&M}$ = $2,539,000	

Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(I*(1+I)^n))$ **$P_{O\&M}$ = $26,898,202** **3**

or P=A(P/A,i%,n_2) **where:** i = 0.07 *and* n_2 = 20 **yrs.**

See Table below for the n_2 years

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*

S = **4**

Total Present Value of Project of 20 **Year Life** = *(Line Items#1+2+3+4)* **P = $54,933,100** **5**

Equivalent Annual Cost of the Project "A" = $P*((I*(1+i)^n)/((1+I)^n-1))$ **A = $5,185,296** **6**

or A = P(A/P,7%,20)

Revised: *January 2008*

CIP 1194

New CIP 212003

Detroit Water & Sewerage Department

interdepartmental
MEMORANDUM

From: Parvez Jafri
Head Engineer of Water Systems

Date: April 7, 2008

Thru: Ramesh Shukla RS RCJ
Assistant Director- Engineering Services

Copy to: S. Kuplicki
S. Bailey III
J. Richards
P. Jafri
S. Ali
R. Shiravanthe

To: Andre' Lowe
General Manager-OPMA

Re: CIP No. 1143: Aeration System Improvements
CIP No. 1163: Replacement of Influent Gates
And Operators on Aeration Basin No.1 and 2.
Request to combine CIP Proposal 1163 And CIP Proposal 1143

The Wastewater Treatment Plant recently requested to combine the CIP project No. 1163 (Replacement of Influent Gates and Operators on Aeration Basin No.1 and 2.) and CIP project No. 1143 (Aeration System Improvements), at the CIP Coordination meeting held on February 12, 2008 at the WWTP. The reason for this consolidation is to avoid delays in designing and executing the projects.

We request that the funds approved for CIP 1163 and CIP 1143 to be added and consolidated as a new project proposal re-titled as "Aeration System Improvements at the Wastewater Treatment Plant" in the new CIP report for FY 2007-08. Please be advised that funds for CIP 1143 and CIP 1163 have not yet been used, as both proposals are in the initial stages.

For your information, we will process the DRMS project number request as and when the above captioned consolidated new project is approved.

If you have any questions, please call Ravi Shiravanthe of my staff at 297-5958.

Parvez Jafri
Head Engineer of Water Systems

PJ/SR/sr

Attachments:

1.	Copy of new Project Proposal CIP 1143, (Aeration System Improvements)	5 Sheets
2.	Projected Expenditures for the new Project Proposal	1 Sheet
3.	Capital Cost Estimate Worksheet	1 sheet
4.	Present Value/Life Cycle Cost Analysis Worksheet	1 sheet

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 212003

CIP #: 1194

Project Title: **Aeration System Improvements** **Contract Number:**

Description: Improve aeration system and provide necessary inter-connections

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 13,855 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-			-	$ 2,242	$ 11,100	$ 2,642	$ -	$ -	$ -	$ -	15,984
617950	Contractual Engineering Service		-			-	$ 106	$ 97	$ 16	$ -	$ -	$ -	$ -	219
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 2,348	$ 11,197	$ 2,658	$ -	$ -	$ -	$ -	$ 16,203

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-		$ -	$ 2,348	$ 11,197	$ 2,658	$ -	$ -	$ -	$ -		16,203
Sewer I&E		-				-	-	-	-	-			-
	Project Total	$ -	$ -	$ -	$ 2,348	$ 11,197	$ 2,658	$ -	$ -	$ -	$ -	$ -	$ 16,203

PROJECTED (000)

(000)	FY 2016-17 and prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$2,348	$11,197	$2,658	$0	$0	$0	$0	$16,203

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: [ ] Yes [0] No CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**Rehabilitation of Central Offload Facility (CIP 1221)**
Project Significance	Refurbishment or replacement of COF equipment including sludge storage bins, conveyors, and lime offload system, scrubber system, HVAC, etc., will improve reliability and performance. This improvement will enable WWTP to be in compliance with NPDES permit.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared Click dropdown to enter date. **Project Origin** Project Origin

Project Manager/Sponsor	Beena Chackunkal	Engineer	Wastewater Design
	Beena.chackunkal@glwater.com		313-297-9825
CMG Rep	Monica Y Daniels	Engineer	Financial Services
	Monica.daniels@glwater.org		(313) 964-9248

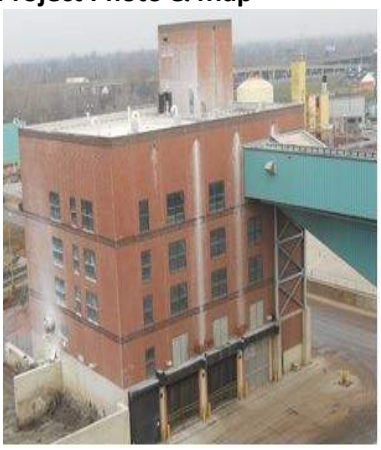
Other Project Team Members

Name	Title	Division	Phone	Email
Alfredo Lava	Engineer	Wastewater Design	313-297-5940	Alfredo.lava@glwater.org

Site Name	Wastewater Treatment Plant
If Facility, Facility Address	9300 West Jefferson Ave, Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Construction
Primary Focus	Central Offload Facility
Previous Project Status	Active
Current CIP Project Status	Active

2. PROJECT INFORMATION

Project Photo & Map



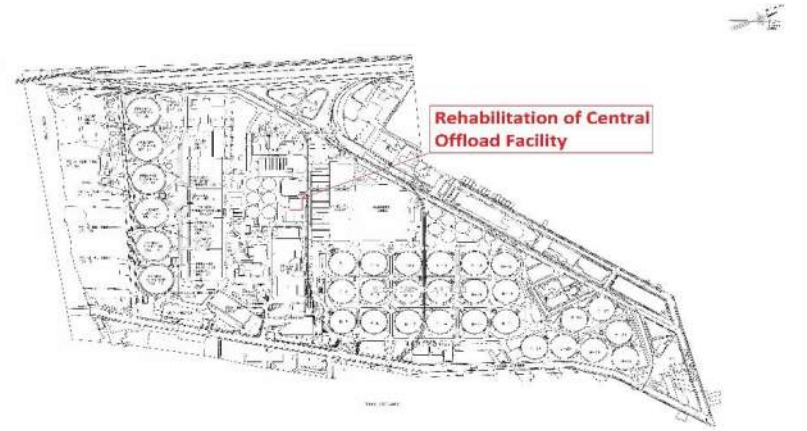


Photo Caption

The COF started operation in 2005. The major issue is the storage hopper slide gates above the sludge/lime mixers. The plant has also experienced issues with the original electric actuators on all the gates from the screw conveyors and from the storage bins. Powdered lime discharges into the COF causing lime to discharge throughout the building making the scrubber system to fail.

Location map of Central Offload Facility at the WWTP

Problem Statement	The COF started operation in 2005. There are number of issues which affect the entire facility. The major issue is the storage hopper slide gates above the sludge/lime mixers. The gates did not seal and were not liquid tight when the storage bin was filled beyond 65% of its capacity, thus causing equipment failure and drain plugging. The plant has also experienced issues with the original electric actuators on all the gates from the screw conveyors and from the storage bins. Replacement of the electric actuators with pneumatic actuators is recommended. Powdered lime discharges into the COF have occurred in the past, causing lime to discharge throughout the building. Construction of a containment wall around the lime addition area to contain these types of discharges is recommended. The proposed CIP-1221 budget is for construction only. The design for this project is ongoing through CS-060 Sludge Conveyance Improvements Project.
History / Background	The Central Offload Facility was built under PC-744 (DWP-1074) as a design build project in 2005. The project completion was delayed due to the lime sludge slide gates on the lime mixers which were continuously leaking whenever sludge head in storage bins was high. This problem was finally resolved after replacing the gates. Due to the nature of lime and sludge and continuous operation of this

	facility, the equipment started failing causing various operational and maintenance problems. Eventually, the facility needs a major rehabilitation.
Preliminary Scope of Work	The preliminary scope of work consists of the Study, Design for the rehabilitation or replacement of the three live bottom hoppers, three Lime silos, three lime mixers, all screw conveyors and related conveyors, electrical equipment, Scrubber system, HVAC and other related equipment. Additional items need to address include drainage system and concrete pavement repair for the pad area, improvement needed for yard drainage system around the building, door and rollup door rehabilitation/replacement, CCTV System rehabilitation/replacement. Work also consists of the following: Passenger Elevator rehabilitation or replacement • Lighting system improvements for the COF and Extension buildings • Emergency shower and Eye wash stations rehabilitation/replacement • better system for lime venting. Replacement of lime supply lines to the lime silos. • COF building roof replacement • Electric room and control rooms need to be positive pressure for lime dust control and installation of loading bay fire hydrant for truck washing.
Related projects currently underway or planned	CS-1484: Rehabilitation of Primary Clarifiers, Drain Lines, Hot Water, and Scum Lines PC 789 – Pump Station No. 1 Rack and Grit Building, MPI and JSS Improvements
Potential Challenges	Maintaining the MDEQ-NPDES required capacity during the construction phase of the project.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	2 - Performance (Service Level/Reliability)
Explanation	The gates did not seal causing equipment failure and drain plugging. Powdered lime discharges throughout the building making ventilation and scrubber system to fail.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 8/8/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study/Design/ Construction Assistance	Under Procurement	$800	$350	$250	$350	$0	$0	$0	$1,750	
Construction	Not yet started	$0	$5500	$6500	$4000	$0	$0	$0	$16,000	3 Years
Year Totals		$ 800	$5,850	$6,750	$4,350	$ 0	$ 0	$ 0	**$17,750**	3 Year

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Original CIP Budget for this project was $10M, during the consultant services contract negotiation it was observed the construction budget will fall short from the current planned CIP budget. Addition CIP Budget transfer from the existing project is transferred. Additional budget made available from the following projects:
CIP# 1144, Construction Contract PC-781 = $1.5 M
CIP# 1253, Construction Contract PC-791 = $2.0 M
CIP# 366, Construction Contract PC-783 = $2.5 M
Total Added = $6.0 M
Existing CIP Budget = $10.0 M
Total New CIP Budget = $16.0 M

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Alternative to rehabilitation of the existing COF is build a new facility.
Description of Alternative Evaluation	Alternative to rehabilitation is building new central offload facility with new process equipment, which will be very expensive than rehabilitation.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Equipment has been in service for over 10 years and failing frequently.
2) Performance (Service Level / Reliability)	4	Significant reduction in performance.
3) Regulatory (Environmental / Legal)	5	Need for biosolids disposal to meet permit requirements during wet weather.
4) O&M	4	Excessive O&M required if not fixed
5) Public Health & Safety	3	Maintain solid disposal capacity at the WWTP is key to the public health and safety.
6) Public Benefit	3	Maintain water quality.
7) Financial	3	Save on excessive O&M and potential fines.
8) Efficiency	4	The COF operation will be much more efficient.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	4	9.60	Poor condition
2) Performance (Service Level / Reliability) 15%	4	4	12.00	Poor condition
3) Regulatory (Environmental / Legal) 18%	5	2	7.20	Low impact
4) O&M 11%	4	4	8.80	High maintenance
5) Public Health & Safety 17%	3	4	13.60	Dust and drainage issues; some potential
6) Public Benefit 8%	3	2	3.20	Limited public benefit
7) Financial 10%	3	2	4.00	Low positive savings
8) Efficiency 9%	4	1	1.80	No significant impact
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**60.20**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	8/15/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

New CIP 213002

GLWA Great Lakes Water Authority — Capital Improvement Program

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1221

Contract Number:

Project Title: **Rehabilitation of Central Offload Facility**

Description: Refurbishment or replacement of COF equipment including sludge storage bins, conveyors, and lime offload system, scrubber system, HVAC, etc., will improve reliability and performance. This improvement will enable WRRF to be in compliance with NPDES permit.

Lead Division:

Division Leader:

Project Manager: Beena Chackunkal

Phone:

Department Charged: Water | Sewage X | Both

Project Type: Study **(S)** X | Design **(D)** X | Construction **(C)** X | Construction Management **(CM)** | Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X | Design Build **(DB)** | Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 16,950

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
Project Costs $(000)													
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-		-	$ -	$ 5,500	$ 6,500	$ 4,000	$ -	$ -	$ -	16,000
617950	Contractual Engineering Service		-		-	$ 800	$ 350	$ 250	$ 350	$ -	$ -	$ -	1,750
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 800	$ 5,850	$ 6,750	$ 4,350	$ -	$ -	$ -	$ 17,750
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	$ -	$ -	$ 800	$ 5,850	$ 6,750	$ 4,350	$ -	$ -		17,750
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ -	$ -	$ 800	$ 5,850	$ 6,750	$ 4,350	$ -	$ -	$ -	$ 17,750

PROJECTED (000)

(000)	FY 2016-17 and prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$800	$5,850	$6,750	$4,350	$0	$0	$0	$17,750

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: [ ] Yes [0] No — CMG — Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Finance Manager — Date:

Accounting Approval: Date:

Authorization to Proceed: Chief Executive Officer/Chief Operating Officer — Date:

W Fund No: 0 | **Cost Center** 0 | **Object No.** 0 | **WSS Project No.:** 0

S Fund No: 0 | **Cost Center** 0 | **Object No.** 0 | **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**Chlorination/Dechlorination Process Equipment Improvements (CIP-1222)**
Project Significance	The disinfection complex equipment condition has deteriorated because of the corrosive characteristics of the chemicals utilized in the operations of the area. This project is needed to restore equipment performance to OEM levels.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/29/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Sanjeev Mungarwadi	Engineering Manager	WWOG
	Sanjeev.mungarwadi@glwater.org		3132978819
CMG Rep	Monica Y Daniels	Manager	Wastewater
	Monica.daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Kenneth Singleton	Engineer	WWOG	313 297-9826	kenneth.singleton@glwater.org

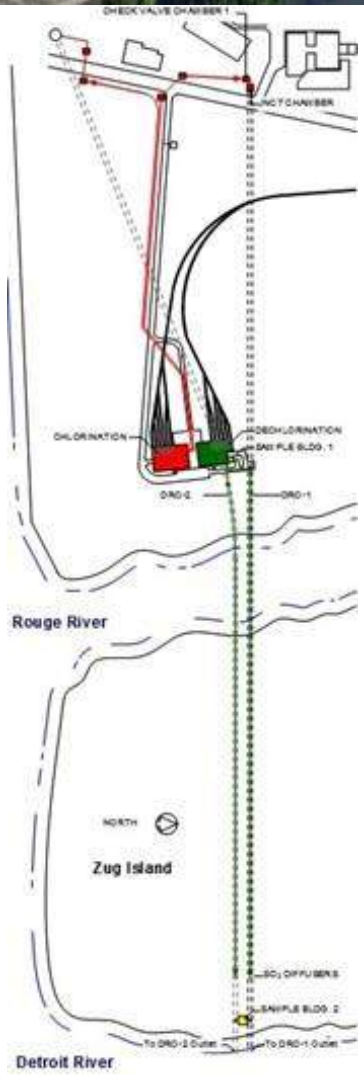
Site Name	Wastewater Treatment Plant
If Facility, Facility Address	9300 West Jefferson, Detroit MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Construction
Primary Focus	WWTP Chlorination/De-chlorination System
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

The condition of the process equipment in the Disinfection Complex has deteriorated. This complex was commissioned in 2003 and was expected to operate until 2023. Refurbishment of evaporators, chlorinators/sulfonators, Replacement of regulating check valves, ejectors, process water valves, gas safety panels, compressors, gas flow meters, and all accessories



Map of the Chlorination and De-chlorination system at the WWTP.

Problem Statement	The condition of the process equipment in the Disinfection Complex has deteriorated. The ability to disinfect the wastewater adequately requires to comply with the fecal coliform criteria in the NPDES permit. This proposed CIP budget is for construction only. The design and construction assistance services are budgeted through Sigma As Needed Engineering Services Contract CS-1481, Task #23.
History / Background	The DMT Disinfection Complex was commissioned in 2003 and was expected to operate until 2023 without any major projects. However budget and staffing reductions caused the scheduled maintenance to be reduced so the equipment condition has deteriorated.
Preliminary Scope of Work	Scope of Work is to refurbish evaporators, chlorinators/sulfonators, replace regulating check valves, ejectors, process water valves, gas safety panels, compressors, gas flow meters, and all accessories and appurtenances. The RRO disinfection project's PC-797 control and existing DRO Chlorination and De-chlorination system controls needs to be integrated during the design and construction phase of "RRO Disinfection Project PC-797" in order to meet future NPDES Permit requirements. This proposed CIP budget is for construction only. The design and construction assistance services are budgeted through Sigma As Needed Engineering Services Contract CS-1481, Task #23.
Related projects currently underway or planned	The RRO segment 2, and RRO Disinfection Projects (PC-797) are potentially affected by this task. The RRO disinfection project's PC-797 control and existing DRO Chlorination and De-chlorination system control needs to be integrated during the design and construction phase of "RRO Disinfection Project PC-797" in order to meet NPDES Permit requirements.
Potential Challenges	Chlorine and sulfur dioxide are both extremely hazardous toxic chemicals that can impact staff and the public if an uncontrolled gas release occurs. Maintaining staff safety, regulatory compliance, and meeting production requirements is a challenge.
Other – important project information, photos, etc. not fitting in other	The designer's investigation has determined that the maintenance of the equipment hasn't been performed at the recommended intervals. It was concluded that rebuilding the equipment and maintaining according to OEM specifications would provide reliable performance. Because the change in scope from replace to rebuild equipment the project cost was reduced.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project 1 - Condition

Explanation	Non-compliance with the manufacturers recommended maintenance schedule has caused the disinfection equipment condition to deteriorate.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Chlorination/Dechlorination at WWTP	920820	$25,000,000	Rehab

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 8/8/2016 **Prepared By** Wastewater Design Group **Division** Wastewater Operations

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Construction	Select Status of Work	$0	$400	$2800	$1800	$0	$0	$0	$5,000	3 years
Year Totals		$ 0	$ 400	$2,800	$1,800	$ 0	$ 0	$ 0	**$5,000**	3 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Alternate to repair and rehabilitation is replacement in kind with new pipes.
Description of Alternative Evaluation	The replacement in kind with new pipe will be more expensive than the repair and rehabilitation.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Some components are passed their useful life (i.e 30-40 years)
2) Performance (Service Level / Reliability)	4	Some of the valves are badly corroded and difficult to operate with high probability of failure.
3) Regulatory (Environmental / Legal)	5	If the SFE pipes fail there is an immediate risk of non-compliance for air permits.
4) O&M	4	Significant O&M is required to keep the pipes and valves in operating condition.
5) Public Health & Safety	3	Permit violations would cause both air quality and water quality impacts.
6) Public Benefit	4	Public will benefit from improved air and water quality.
7) Financial	3	Exposure to multiple fines for permit violations.
8) Efficiency	4	Project will have a significant impact on efficiency of other equipment by keeping them in service.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	5	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	3	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	4	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	3	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	8/8/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Sanjeev Mungarwadi	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

New CIP 212004

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1222

Project Title: **Chloronation and DeChloronation Process Equipment Improvements** **Contract Number:**

Description: Restore equipment to original equipment levels. Equipment has deteriorated due to caustic nature of the chemicals in these processes.

Lead Division: Division Leader:

Project Manager: Unknown Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 5,000 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	11	77	50	-	-	-	138
601997	Capital Allocation: Fringe Benefits	40%	-				4	31	20	-	-	-	55
601998	Capital Allocation: Nonpersonnel	5%	-				1	4	2	-	-	-	7
616900	Construction		-				329	2,302	1,480	-	-	-	4,110
617950	Contractual Engineering Service		-				55	386	248	-	-	-	690
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	400	2,800	1,800	-	-	-	5,000

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-			-	-	400	2,800	1,800	-	-	-	5,000
Sewer I&E		-											-
Project Total		$ -	$ -	$ -	$ -	$ -	$ 400	$ 2,800	$ 1,800	$ -	$ -	$ -	$ 5,000

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18		FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$0	$400		$2,800	$1,800	$0	$0	$0	$5,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No Date:

(circle applicable funding source): **Bond I&E** CMG

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: August 2, 2016

GLWA
Great Lakes Water Authority

Project Title	**Rehabilitation of Various Sampling Sites and PS# 2 Ferric Chloride System at WWTP (CIP 1223)**
Project Significance	The work consists of rehabilitation of the existing sampling stations including removal and installation of new samplers, pumps, piping, housing, and related equipment at various sampling sites at WWTP. This work also include construction of Ferric Chloride System at PS # 2. These improvements will enable WWTP to be in compliance with NPDES permit.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/28/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Beena Chackunkal	Group leader	Engineering
	Beena.Chackunkal@glwater.org		313-297-9825
CMG Rep	Monica Daniels	Manager	CMG
	Monica.Daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Alfredo Lava	Engineer	Engineering	313-297-5940	Alfredo.Lava@glwater.org

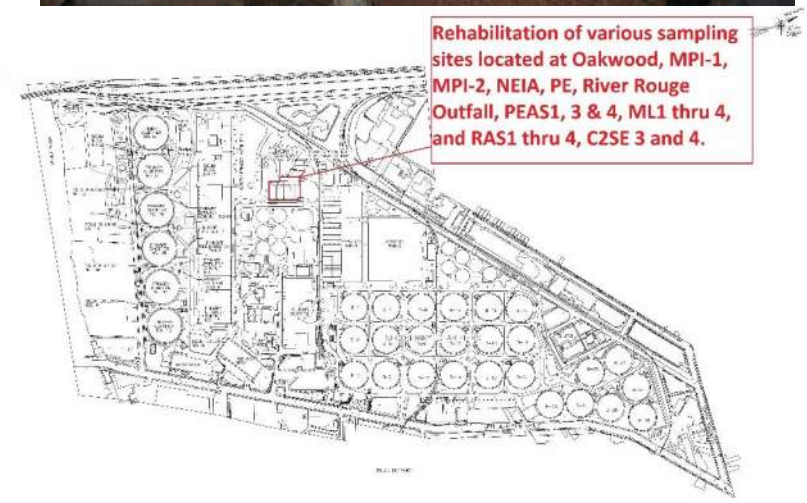
Site Name	Wastewater Treatment Plant
If Facility, Facility Address	9300 W. Jefferson Ave., Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction Assistance
Primary Focus	Various Sampling Sites at WWTP
Previous Project Status	Active
Current CIP Project Status	Active

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

The RAS-3 sampling station located in the basement of Intermediate Lift Pump No. 2 (ILP No. 2) Building and samples the return activated sludge flows to Aeration Deck No.4.



WWTP Map. Sampling station are located at Oakwood, MPI-1, MPI-2, NEIA, PE, River Rouge Outfall, PEAS1, 3 & 4, ML1 thru 4, and RAS1 thru 4, C2SE 3 and 4 locations throughout the WWTP.

Problem Statement

The WWTP sampling stations as listed under CIP No. 1223 are experiencing frequent maintenance and shut down due to the failure of samplers and its associated equipment. The failure in collection of proper sampling of different wastewater streams at the plant causing improper analysis of sampling report. The Ferric Chloride Chemical feed system needs urgent rehabilitation at PS#2 as equipment is serving for 20 years and now beyond it is useful life. This report has to be submitted to MDNRE as per the requirements. Unreliable sampling data may create problems to plant's process and penalties by the regulatory agency. The WWTP sampling station rehabilitation design is completed by Sigma under As Needed Engineering Services Contact CS-1481, Task 18. The WWTP PS# 2 rehabilitation design is completed by METCO under As Needed Engineering Services Contact CS-1499, Task 38. The proposed CIP-1223 budget is for construction cost only.

History / Background	The sampling sites are located at plant vicinity and they collect samples to monitor permit compliance and setting up the process performance. They use automated composite samples which generally collect the permit required samples. Some of the samples cannot be performed at the site. Therefore, they are collected and analyzed for composite samples. The subject sampling stations are required to be rehabilitated or replaced for meeting the permit sampling requirements. These sampling stations regularly fails to collect samples due to the clogging problem in the sample line. Recommended solutions to address line clogging issues include sample line sizes; providing different types of flushing system, which may include automatic flushing; providing different types of sample pump and/or comminutor; and relocating sample pumps. The major recommended rehabilitation made under CS-2010, task 69 sec. 5.8 includes; • Rehabilitation of Sampler building located at Jefferson Interceptor • Unable to use Sigma Sampler due associated problems with cooling system • Rehabilitation of Sampler pumps • Clogging of drain lines • Problems in sample collections from manhole • Problems with unknown recycle flow at upstream of the sampler of Oakwood interceptor • No backflush system • Frequent clogging in sampler lines Also replacement of existing sampling equipment, installing new samplers, pumps, piping housing and support equipment as I&C, HVAC, etc. per proposed rehabilitation recommended through Need Assessment 2010 – 2016 for other sampling stations.
Preliminary Scope of Work	The study and design to rehabilitate various sampling station has been completed under As Needed Engineering Services Contract CS-1481, Task #18 and construction will be bid out. The scope of this project included: Review the additional need for Ovation System, if needed. Conduct detailed study of all the listed sampling stations and their rehabilitation, provide the design for the removal and installation of existing samplers, pumps, piping, housing and related equipment in the Sampling Buildings causing frequent shutdowns due to poor back flush, clogging and difficult to obtain reliable analysis for compliance samples submitted to the MDNRE. The Sampling sites are located at Oakwood, MPI-1, MPI-2, NEIA, PE, River Rouge Outfall, PEAS1, 3 & 4, ML1 thru 4, and RAS1 thru 4, C2SE 3 and 4. Sampling is performed to monitor permit compliance and process performance. Rehabilitation of these sampling facilities will improve system reliability and allow for consistent and accurate sampling. The scope of work performed for sampling station rehabilitation include study, design, construction assistance and construction. The construction of this project shall follow the sequencing of shutdown to ensure WWTP meet the NPDES required permit throughout the rehabilitation period.

Related projects currently underway or planned	CS-1484: Rehabilitation of Primary Clarifiers, Drain Lines, Hot Water, and Scum Lines PC 789 – Pump Station No. 1 Rack and Grit Building, MPI and JSS Improvements PC 795 – Pump Station No. 2 Improvements, CS-1481 Task-18 – Rehabilitation of grit and Screening System at Pump Station No. 2 and Rehabilitation of Sampling Sites at WWTP.
Potential Challenges	Maintaining the MDEQ-NPDES required capacity during the construction phase of the project.
Other – important project information, photos, etc. not fitting in other	The original CIP Project Proposal CIP-1223, "Rehabilitation of Grit and Screening System at PS-2 and Rehabilitation of Sampling Sites at WWTP" included two major scope items; Rehabilitation of Grit & Bar Screening System and Sampling Stations. That construction budget for CIP-1223 amount $11 M was set aside in CIP. The design for Grit & Screening System and Sampling Station are 90% complete under As Needed Engineering Services Contract, CS-1481 Task 18. The construction for "Rehabilitation of Sampling Sites" will move forward and be bid out separately for construction without Grit & Bar Screening System. The Bar Rack System and Grit System 90% design by Sigma under As Needed Engineering Services Contact CS-1481, Task 18 is on hold and will not proceed for construction as designed. An engineering decision to have a fresh look and start new study, design and construction project through CIP CIP-1314 will proceed. The proposed CIP budget is for construction cost only. The original budget CIP-1223=$11M. The original budget for CIP-1123 has been reduced to $5M and $6M budget has been transferred to CIP-1314 to complete study, design and construction of Grit and Screening System at PS#2.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	2 - Performance (Service Level/Reliability)
Explanation	Plant operations report on the failure of shear pins and accelerated wearing and tearing of the bar racks causing downtime for the maintenance and violation of the permit

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.
Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.
Salvage Value: The estimated value of an asset at the end of its useful life.
Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/27/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Construction	In Proposed CIP	$0	$2500	$2500	$0	$0	$0	$0	$5000	2 Years
Year Totals		$ 0	$2,500	$2,500	$ 0	$ 0	$ 0	$ 0	**$5,000**	2 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Construction	Select Status of Work	$0	$0	$0	$0	$0	$(000s)	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative to rehabilitation of sampling facilities is to build new sampling facilities at the WWTP.
Description of Alternative Evaluation	The construction of new sampling facilities will be much higher than rehabilitation.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Equipment is over 20 years old.
2) Performance (Service Level / Reliability)	4	Level of service is very poor.
3) Regulatory (Environmental / Legal)	4	This will improve ability to meet permit requirements.
4) O&M	3	This will reduce O&M costs.
5) Public Health & Safety	3	Improves water quality.
6) Public Benefit	3	Improves water quality.
7) Financial	3	Reduce O&M costs.
8) Efficiency	3	More efficient operation.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	4	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	3	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	3	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	3	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	3	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	8/1/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 216004

CIP #: 1223

Project Title: **Rehabilitation of Grit and Screening System at PS-2 and Rehabilitation of Sampling Sites at WRRF**

Contract Number:

Description: The work consists of rehabilitation of the existing sampling stations including removal and installation of new samplers, pumps, piping, housing, and related equipment at various sampling sites at WWTP. This work also include construction of Ferric Chloride System at PS # 2. These improvements will enable WWTP to be in compliance with NPDES permit.

Lead Division: _____ Division Leader: _____

Project Manager: Unknown Phone: _____ Department Charged: Water _____ Sewage X Both

Project Type: Study **(S)** _____ Design **(D)** _____ Construction **(C)** X Construction Management **(CM)** _____ Construction Assist. **(CA)** or Design Build Assistance **(DBA)** _____ Design Build **(DB)** _____ Purchase Order **(PO)** or Information Technology **(IT)** _____

CIP Budgeted Amount: 2018-2022FY $ 5,000 Estimated Start Date *: _____ Estimated Completion Date *: _____

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	-	-	-	-	-	-	-
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-				2,500	2,500	-	-	-	-	5,000
617950	Contractual Engineering Service		-				-	-	-	-	-	-	-
	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	2,500	2,500	-	-	-	-	5,000

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-			-	-	2,500	2,500	-	-	-	-	5,000
Sewer I&E		-											-
Project Total		$ -	$ -	$ -	$ -	$ -	$ 2,500	$ 2,500	$ -	$ -	$ -	$ -	$ 5,000

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$2,500	$2,500	$0	$0	$0	$0	$5,000

Requested By: _____ Date: _____

Division Manager: _____ Date: _____

Division Director: _____ Date: _____

Capital Management Group (CMG) - FUNDS AVAILABLE: _____ Date: _____

(circle applicable funding source): **Bond I&E** Yes **0** No CMG

Budget Approval: _____ Date: _____
Finance Manager

Accounting Approval: _____ Date: _____
Accounting Manager/ General Ledger

Authorization to Proceed: _____ Date: _____
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: August 2, 2016

CIP 1235
New CIP 212005

City of Detroit
Water and Sewerage Department
INTRA-DEPARTMENTAL MEMO

FROM: Syed Ali

DATE: March 30, 2011

THRU: James George
Assistant Director-Financial Services

TO: Darryl Latimer
Deputy Director

COPY: Parvez Jafri

RE: CIP Proposal for Rouge River Outfall No. 2 (RRO-2) Segment I - WWTP Modifications

The attached CIP proposal for the construction of the project titled "Rouge River Outfall No. 2 (RRO-2) Segment I – WWTP Modifications" is submitted by the Wastewater Design Group of the Wastewater Operations for inclusion in the current July 2010 CIP. The estimated construction cost is $27.0 million. The project is anticipated to incur construction cost beginning FY 2011-12 except few thousand dollars in force account in FY 2010-11; major expenditure is anticipated beginning FY 2012-13 thru FY 2014-15. This project is required by the negotiated/modified NPDES permit that sets the construction start date of March 30, 2012 and construction completion date of April 1, 2014.

WDG has also submitted a request for DRMS project number to begin the process of bidding as the design is almost complete.

Once the CIP is approved and published, the Capital Management Group (CMG) does not include any new project during the fiscal year unless approved by the Director or Deputy Director. CMG thus needs your approval to include this project in the current July 2010 CIP for further processing of the DRMS project number request.

Should you have any questions, please advise.

Syed Ali, PE
Capital Management Group

Approved:

Darryl A. Latimer
Deputy Director

SA/sa
Attachment(s)

New CIP 212005

DETROIT WATER & SEWERAGE DEPARTMENT

CAPITAL IMPROVEMENT PROGRAM

cip # 1235
Added in July 2010 CIP
with the approval of
Dy. Director

PROJECT PROPOSAL

Project Title: Rouge River Outfall No.2 (RRO-2) Segment 1 – WWTP Modifications.

CIP: Sewerage

1. **Problem Statement**

Rouge River Outfall No.2 (RRO-2) project was developed in lieu of the Detroit River Outfall No.2 (DRO-2), which had been terminated due to the impact on the City's finances of the fiscal year 2008/2009, economic recession and economic hardship. Since the projected construction cost of the Rouge River Outfall No.2 was $150 million, the project was split into two phases. The phase-1 (segment-1) comprises of the ancillary work of the main conduit work and the Phase-2 (Segment-2) is the outfall shallow conduit work.

DWSD and the MDNRE worked together and agreed to complete the Segment 1 work on April 2014 and the Segment-2 to start between 2014 and 2016. Design for RRO-2 Segment-1 is 95 % complete under the consultant contract CS-1448, Modified Detroit River Outfall No.2. (MOD DRO-2). The final design will be completed on March 29, 2011. The construction procurement work will start on May 4, 2011 and the construction Phase-1 will be completed before April 1, 2014 according to the MDNRE mandated schedule.

2. **History**

The DRO-2 Outfall was originally designed in 1998 under CS-1150, and construction began in 1999 under PC-709. Some surface construction work and substantial underground work were performed, including construction of the entrance shaft, two access shafts, six diffuser riser shafts in the Detroit River, and about half of the length of the tunnel. On April 23, 2003, uncontrollable high rates of ground water mixed with Hydrogen Sulphide (H2S) inflow flooded the tunnel, and it has remained so since that time.

After the tunnel flooded, DWSD terminated the PC-709 contract and looked for other alternative to complete the work. After further study of the tunnel construction a different alternative was considered and thus, scope for the MOD DRO-2 under CS-1448 design was established. This contract called for a design to construct a new rock tunnel at a higher elevation with Slurry Shield Tunnel Boring Machine (TBM). The design of the Modified Detroit River Outfall No. 2 (MOD DRO-2) was completed on December 2007 and the construction of the DRO-2 project under PC-771 was started on November 2008. Due to economic hardship during the fiscal year 2008/2009, DWSD requested MDNRE to terminate this Contract. After further discussion an agreement reached with DWSD and MDNRE to allow termination of this Contract and look for feasible and cost effective solutions to meet the wet-weather discharge to Rouge River Outfall. Therefore, on April 2009, DWSD terminated the PC-771, MOD-DRO-2 Contract.

The current RRO-2 design was developed from the feasibility study undertaken by the Consultant Parsons Brinckerhoff Team in mid 2009 to determine the feasibility of constructing a shallow surface outfall to the Rouge River. The proposed Outfall to the Rouge River shall be used during the wet-weather events and primary effluent to the river shall be disinfected by mixing of Chlorine and De-chlorination before discharging to the Rouge River Outfall. It was subsequently agreed by MDNRE that this shorter outfall conduit was permittable and authorization to proceed with the Basis of Design (BOD) for the RRO-2 project was issued on November 6, 2009. After the completion of the BOD and to avoid the funding problem, it was decided to complete RRO-2 work into two segments. Segment- 1 to do the ancillary work such as modification of gates, stop logs and chlorine tank shut off valves at WWTP and the Segment-2 is to provide Conduit to Rouge River Outfall.

3. Project Objective and Alternatives

Project objective is the reliability of the Gates and which leads to feasible control of the effluent when the RRO-2 is in effect and to avoid any surcharge to the plant during high level of the River. The proposed objective also meets the NPDES Permit for the plant effluent discharge. There are no other suitable alternatives of these gates modification.

4. Operational Benefits of Proposed Project

SL-8 stop logs are very old and not reliable to the conduit and other gates modification. Extension of the top leaf of Movable Dam MD-1 will prevent the back flow from the river. Replacement of electrical actuators to hydraulic actuators of Gates SG-41-44 and MD 3 A/B and MD-4 A/B will get more maintenance free operation and can avoid stalling in operation. Chlorination tank car emergency shut off valve modification will improve the safety of the operators. There are some Control and Monitoring modification to Chlorination and Dechlorination to meet the current and future MDNRE Permit requirement.

5. Financial Benefits of Project Proposal

The modification work of the gates will reduce the operation time and reduce the shut down maintenance work. The net present value of this project is $37,424,464.00 based on the attached analysis. Reduced maintenance cost will offset the capital outlay required to modify the gate. This project will have no impact on revenues.

6. Preliminary Scope of Work

A. The main elements of Work to be undertaken for this project consist of the following, but are not limited to:

1. Removable of PC-709 precast concrete tunnel lining segments presently stored on the DMT site by crushing for Entrance shaft backfill and site restoration material.

2. Plug existing PC-709 Entrance Shaft with crushed PC-709 precast concrete tunnel lining segments stockpiled on the DMT site, with provisions to grout and/or incorporate into tremie concrete.

3. Installation of new SL-8 guides, sills and stop logs.

4. Modification of Movable Dam MD-1 to extend top leaf.

5. Installation of two new power pack buildings.

6. Replacement of electrical actuators with hydraulic actuation system for MD-3 A/B, MD-4 A/B and SG 41-44 gates.
7. Replace existing dechlorination tank car emergency shutoff valves with pneumatically operated actuation system to allow emergency isolation of tank cars using tank car isolation valves.

8. Modification of the existing PLC based chlorination and dechlorination control system with an Ovation based or Rockwell control systems.

9. Relocation and modification of primary effluent sampling system

10. Demolition of Salt Storage Building on the DMT site including abatement of hazardous materials.

11. Modification of stop logs SL-1 A/B to operable gates for remote operation including electric actuators, guide extension and supporting structures.

7. Related Projects Completed, Currently Underway or Planned

1. CS-1448, RRO-2 Segment 2, Shallow Conduit Work planned.

8. Time Requirements

Design Completion----------April 01, 2011

Construction Start----------March 30, 2012

Construction completion----------April 1, 2014

9. Preliminary Cost Estimates

Construction: $27,000,000.00

CIP FISCAL YEAR EXPENDITURES PROJECTIONS

DETROIT WATER & SEWERAGE DEPARTMENT

CAPITAL IMPROVEMENT PROGRAM

2010-11	2011-12	2012-2013	2013-14	2014-15	Remaining	Total
$o	$600,000	$10,000,000	$10,000,000	$5,400,000	$1,000,000	$27,000,000

10. Identification of In-House Responsibility

Design: Wastewater Design Group
Construction: Wastewater Construction Group

Contact persons:

Contact Persons	
WWTP Engineering	Parvez Jafri Arshed Ramankutty
WWTP O&M	Jared Richards
WWTP Administrative	Samuel Smalley

Submitted by: Date 02/03/2011
Arshed Ramankutty, P.E.
Associate Mechanical Engineer

Recommended by: Date 2/3/11
Parvez Jafri, P.E.
Head Engineer of Water System

Approved by: Date 2/4/11
Samuel Smalley, P.E.
Assistant Director-Wastewater Operations

INSTRUCTIONS: **Project Manager must input data in the blue cells.** The white cells are automatically calculated.
COMPLETE THIS PAGE FIRST BEFORE INPUTTING DATA ON PAGE 2

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet

PROJECT TITLE: Rouge River Outfall No.2 (RRO-2) Segment 1 - WWTP Modifications

	Input Data Into Colored Boxes		Period Duration	Line Item #
Study Phase				
Consultant Fee	$0	Already charged under CS-1448		
In-house Force Account	$0	Study Phase is over		
Sum Total of Study Phase		$0	0.0 yrs.	1
Design Phase				
Consultant Fee	$0	Already charged under 1448		
In-house Force Account	$0	Design Phase is over		
Sum Total of Design Phase		$0	0.0 yrs.	2
Construction Phase				
Construction Cost				
Civil Items	$4,000,000			
Mechanical Items	$9,700,000			
Electrical Items	$4,000,000			
Miscellaneous *(Material Costs: wiring, etc.)*	$1,500,000			
Subtotal Sum	$19,200,000			3
Mobilization & Demobilization Costs: *(3% of Line Item# 3)*	$576,000			4
Subtotal *(Line Items# 3+4)*	$19,776,000			5
G.C./O.H./Profit: *(15% of Line Item# 5)*.....	$2,966,400			6
Subtotal *(Line Items# 5+6)*	$22,742,400			7
Provisionary/Contingency Allowance: *(10% of Line Item# 7)*	$2,274,240			8
Subtotal **Construction Cost** *(Line Items# 7+8)*	$25,016,640			9
Consultant Fee for Construction Assistance Services	$381,687			10
In-house Force Account for Construction Phase	$1,250,000			11
Sum Total of Construction Phase *(Line Items# 9+10+11)*		$26,648,327	4.0 yrs.	12
GRAND TOTAL CAPITAL COST ESTIMATE: *(Line Items# 1+2+12)* ...		$26,648,327	**4.0 yrs.**	13
		say ***$27,000,000***		

FY	2010-11	2011-12	2012-13	2013-14	2014-15	Remaining	TOTAL
	$0	$600,000	$10,000,000	$10,000,000	$5,400,000	$1,000,000	$27,000,000

For Information Only
ESTIMATED OPERATIONS AND MAINTENANCE COST NEEDED WITH THIS CONTRACT
(This O&M Amount Is Not Included In The Capital Cost Calculations Shown Above)

FY	2015-16	2016-17	2017-18	2018-19	2019-20	Remaining	TOTAL

Revised: February *2010*

INSTRUCTIONS: Project Manager must input data in the blue cells.
The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Present Value/Life Cycle Cost Analysis Worksheet

PROJECT TITLE: Rouge River Outfall No.2 (RRO-2) Segment 1 - WWTP Modifications

(provide information in the blue shaded cells only. All other cells are auto-calculated)

Capital Cost "C"

Design & Installation Cost for the New Equipment		Line Item #
Estimated Study Phase Consultant Fee		
Estimated Study Phase Force Account Cost		
Estimated Design Phase Consultant Fee		
Estimated Design Phase Force Account Cost		
Estimated Construction Cost (Contractor)	$25,016,640	
Estimated Construction Phase Assistance Consultant Fee	$381,687	
Estimated Construction Phase Assistance Force Account Cost	$1,250,000	
Sum Total of "Present Value of Capital Cost" Items	**C = $26,648,327**	1

Study, Design, and Construction Period Interest Value "I"

Total Project Period: n_1 = 4.0 years *(this includes study, design, and construction phases)*

Interest Rate: i = 7.0 % per year

Present Interest Value "I" = ($i*n_1*C)*.5 **I = $3,730,766** 2

Annual Operation & Maintenance Cost "A"

	New Equipment	Existing Equipment for Info Only
Operation Labor Cost	$300,000	$500,000
Maintenance Labor Cost	$50,000	$150,000
Equipment & Services Cost	$50,000	$100,000
Energy Cost	$25,000	$35,000
Hauling & Disposal Cost	$0	$0
Cost of Materials	$0	$0
Sum Total of "Annual O & M Cost" Items	$A_{O\&M}$ = $425,000	

Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(i*(1+i)^n))$ $P_{O\&M}$ = **$4,502,456** 3

or P=A(P/A,i%,n_2) **where:** i = 0.07 *and* n_2 = 20 **yrs.**

See Table below for the n_2 years

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*

S = $0 4

Total Present Value of Project of 20 Year Life = *(Line Items#1+2+3+4)* **P = $34,881,549** 5

Equivalent Annual Cost of the Project "A" = P*((i*(1+i)^n)/((1+i)^n-1)) **A = $3,292,571** 6

or A = P(A/P,7%,20)

Revised: February *2010*

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 212005

CIP #: 1235

Project Title: **Rouge River Outfall No. 2 (RRO-2) Segment 1 - WRRF Modifications**

Contract Number:

Description: Cap abandoned entrance shaft of failed DRO-2 tunnel and rehabilitate movable dams and stop logs to control wet weather flow discharge

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ - Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ 12,125	-	$ 62	$ -	$ -	$ -	$ -	$ -	$ -	12,187
617950	Contractual Engineering Service		-		-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 12,125	$ -	$ 62	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,187

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-	$ 12,125	$ -	$ 62	$ -	$ -	$ -	$ -	$ -	$ -		12,187
Sewer I&E		-					-	-	-	-			-
	Project Total	$ -	$ 12,125	$ -	$ 62	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,187

(000)	FY 2016-17 and prior	FY 2017-18	PROJECTED FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$12,187	$0	$0	$0	$0	$0	$0	$12,187

(000)

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**Rehabilitation of the Main Plant Maintenance Building, Replacement of various Plant Maintenance Areas and Work Environment Improvement (CIP 1237)**
Project Significance	Reconfiguring the Main Plant Maintenance building to consolidate and to accommodate the maintenance shops such as welding, millwrights, electrical, instrumentation, and plumbing shops will reduce equipment handling, quicken repairs and improve maintenance efficiency.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **8/2/2016** **Project Origin** Needs Assessment

Project Manager/Sponsor	Beena Chackunkal, P.E.	Engineer	WWOG-Engineering
	Beena.Chackunkal@glwater.org		297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Rao Manyam	Engineer II	WWOG	297-6446	Rao.Manyam@glwater.org

Site Name	WWTP
If Facility, Facility Address	9300 West Jefferson
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	WWTP wide
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

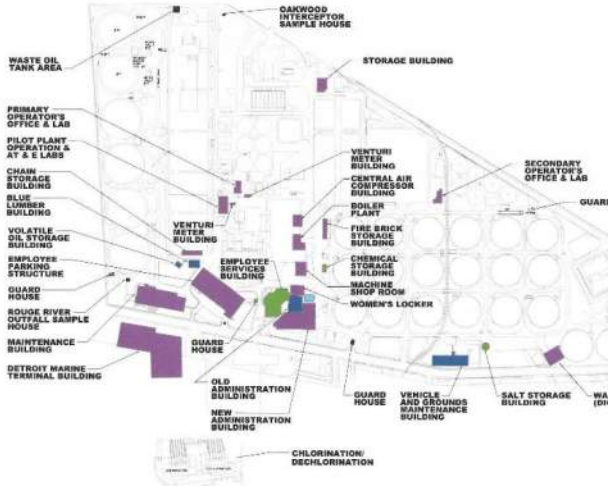
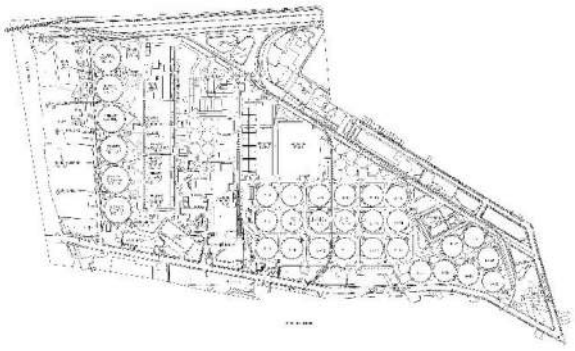


Photo Caption

Support facilities at the WWTP



Map of the WWTP

Problem Statement

The main facilities such as Main Plant Maintenance Building, Vehicle and Grounds Maintenance Building, Dick Storage Building, Machine Shop Building, Chain Storage Building, Fire Brick Storage Building, and miscellaneous maintenance shops in the Incineration and Dewatering complexes are spread throughout the WWTP. Some of the buildings are in bad condition and need rehabilitation. Based on the current GLWA maintenance structure with new optimization plan implemented the need for a consolidated and distributed maintenance area(s) be studied for design and rehabilitation of existing maintenance buildings or construction of new Maintenance Building. Reconfiguring the Main Plant Maintenance building to consolidate and to accommodate the maintenance functions such as Electrical, Instrumentation and Controls, Welding, millwrights, carpentry, and plumbing shops by the GLWA Plant Technicians, ECITs, Team Leaders, and skilled trade and HVAC maintenance contractors using some of the WWTP buildings. Also, WWTP work environment is deteriorating and some of the roads and paving needs rehabilitation. WWTP wide Critical roads have been paved under the PC-783 contract and other items identified as part of approved CIP-972 be consolidated with this proposal.

History / Background	The maintenance spaces at the WWTP consist of main plant maintenance facility located along Jefferson avenue, west parking structure
Preliminary Scope of Work	Study the existing maintenance facilities and evaluate suitable modifications to consolidate the maintenance areas and also to provide sufficient storage. In addition, it will provide new maintenance areas, rehabilitate the needed maintenance facilities such as the existing chain storage and Primary Treatment area. Rehabilitation of Main Maintenance Building: Rehabilitation would include improving the working environment of the building. The various building systems, including heating, ventilation, electrical, and lighting would be improved to be in compliance with applicable building codes and regulations
Related projects currently underway or planned	PC-783, PC-789, and PC-790, and PC-798A
Potential Challenges	Requires significant input from Operations and Maintenance due to changes in the organizational structure and functions, since the original CIP proposal approved on 03/11/11. Also, require temporary work spaces to accommodate new and rehabilitation of the existing maintenance areas.
Other – important project information, photos, etc. not fitting in other	PC-744 Contract DWP-1022: Space Utilization Study,: DWP-1007, DWP-1046, PC-787, DWP-1047, DWP-1021, DWP-1074, CIP 1221, CIP 1285, NAS 2010, 2013, and 2016

Additional Reference Documents: Use button below or include file path to network location.

http://sp.dwsd.org/WWTP/AsBuilds/SitePages/Home.aspx and Z:\WWTP-Design Group\Contracts\CIP Proposals\CIP 1237_Maint Bldgs.pdf (This document be modified to read "under PC-783 critical roads of WWTP wide have been paved and PC-789 constructed an off load facility on the south side of the PS1 Rack and Grit Building (ie paragraph 3 of problem statement on page 1 and page 3 corresponding to "Replace the Loading dock on the south side of the Rack and Grit Buidling and Complex 1).

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	2 - Performance (Service Level/Reliability)
Explanation	The Plant Maintenance Building was constructed in 1971, and since then no improvements have been performed

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.
Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.
Salvage Value: The estimated value of an asset at the end of its useful life.
Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 8/8/2016 **Prepared By** Wastewater Design Group **Division** Wastewater Operations

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, and Const. Assist.	Not yet started	$0	$1000	$440	$400	$0	$0	$0	$1,840	3 Years
Construction	Not yet started	$0	$500	$5560	$5000	$0	$0	$0	$11,060	3 Years
Year Totals		$ 0	$1,500	$6,000	$5,400	$ 0	$ 0	$ 0	**$12,900**	3 Years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	
Choose/add phase.	Select Status of Work	$0	$0	$ 0	$0	$0	$0	$0	$ 0	
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	An alternative to rehabilitating the building is to build a new one.
Description of Alternative Evaluation	Alternative to build a new building will be very expensive.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance
Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Original maintenance facility and no improvements performed since 1971
2) Performance (Service Level / Reliability)	5	Aged facilities and poor work environment
3) Regulatory (Environmental / Legal)	3	Reduced MIOSHA citations
4) O&M	4	High energy costs
5) Public Health & Safety	3	Increased safety
6) Public Benefit	3	User friendly facility
7) Financial	3	O&M cost savings
8) Efficiency	4	Old buildings are in efficient not streamlined for maintenance application
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	4	9.60	Poor condition
2) Performance (Service Level / Reliability) 15%	5	3	9.00	Generally meets design needs but moderate risk
3) Regulatory (Environmental / Legal) 18%	3	1	3.60	Minimal impact
4) O&M 11%	4	2	4.40	Limited impact
5) Public Health & Safety 17%	3	1	3.40	Minimal impact
6) Public Benefit 8%	3	1	1.60	Minimal public benefit
7) Financial 10%	3	1	2.00	Minimal impact
8) Efficiency 9%	4	3	5.40	5-10% energy use reduction
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**39.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Rao Manyam	8/2/2016	Old CIP updated to the new system format

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
WWDG for study and design phase WWCG for Construction phase Operations and Maintenance staff input during all phases

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal, P.E.	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 216005

CIP #: 1237

Project Title: **Rehabilitation of the Main Plant Maintenance Building, Replacement of Various Plant Maintenance Areas and Work Environment Improvement**

Contract Number:

Description: Reconfiguring the Main Plant Maintenance building to consolidate and to accommodate the maintenance shops such as welding, millwrights, electrical, instrumentation, and plumbing shops will reduce equipment handling, quicken repairs and improve maintenance efficiency.

Lead Division:

Division Leader:

Project Manager:

Phone:

Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 12,900

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ -	-	$ -	$ 500	$ 5,560	$ 5,000	$ -	$ -	$ -	11,060
617950	Contractual Engineering Service		-		-	$ -	$ 1,000	$ 440	$ 400	$ -	$ -	$ -	1,840
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 1,500	$ 6,000	$ 5,400	$ -	$ -	$ -	$ 12,900

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-	$ -	$ -	$ -	$ 1,500	$ 6,000	$ 5,400	$ -	$ -			12,900
Sewer I&E		-				-	-	-	-				-
	Project Total	$ -	$ -	$ -	$ -	$ 1,500	$ 6,000	$ 5,400	$ -	$ -	$ -	$ -	$ 12,900

(000)	FY 2016-17 and prior	FY 2017-18	PROJECTED FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$0	$1,500	$6,000	$5,400	$0	$0	$12,900

(000)

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes: [ ] No: [0] CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Project Title	1241 – Upgrade of Fairview Sanitary Pump Station
Project Significance	The existing Fairview Sanitary Pump Station (FSPS) dates back to 1913 and the existing four sanitary pumps and associated motors are from the 1950s. The station's utility transformers and the house service transformers were installed in early to mid-1940's. It is difficult and costly to obtain replacement parts for the old electrical and mechanical equipment, and therefore this equipment should be replaced. In addition, the existing four sanitary pumping units have high turbulence issues. A notice of violation (NOV) to DWSD (Violation Notice VN-005670) was received from the Michigan Department of Environmental Quality (MDEQ) for discharges that were reported as sanitary sewer overflows (SSOs) between July 11 and 12, 2013. This project is in response to the NOV and the deteriorating condition of the mechanical and electrical systems.
Problem Statement	The FSPS boosts sanitary flows from the Detroit River Interceptor (DRI) to the Wastewater Treatment Plant. The station was originally built over 100 years ago and was not designed for its current service. The capacity of the pumps and station is directly tied to the capacity of the downstream portion of the DRI. During wet weather flows, FSPS pumps have been turned off to reduce CSOs to the Detroit River and redirecting flow to the Conner Creek Pump Station. And, the station does not have an emergency standby power generator.
Potential Challenges	Recent flooding in the Freud Pump Station area was attributed to, but unrelated to the FSPS performance. Ultimately, the service of the FSPS needs to be considered relative to the long term Wastewater Master Plan currently underway.
Project Driver	Condition
Project Cost Estimate	$32,400
BCE Date	04-11-2017
Project Status	Active
Project Location	Fairview Sanitary Pump Station
Project Category	Pumping Stations
Service Area	Wastewater
Project Type	Study, Design, Construction Assisstance & Construction
Primary Focus	Rehabilitation of FSPS to meet current capacity requirements
Related Projects	Wastewater Master Plan and ongoing discussions between GLWA and MDEQ regarding wet weather operational procedures.
Alternative	Selected alternative is necessary to maintain existing throughput while New Pump Station or Bypass is being considered as part of Wastewater Master Plan and ongoing.
Description of Alt. Eval.	Alternative provides for maintaining 240 MGD of capacity through station and replacement of large 60 year old pumps with seven smaller capacity pumps.

Phase	Status	Past Years	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Future Years	Phase Total	Phase Dura-tion
S/D/CA	Active CS-1747	600	1400	350	350	0	0	0	2700	4
C	Not yet started	0	700	1400 0	15000	0	0	0	29700	3
		600	2100	1750	15350	0	0	0	32400	4

CIP Total Score	

CIP 1241

New CIP 232001

City Of Detroit
Water and Sewerage Department
Intra-Departmental Memorandum

From: Mirza Rabbaig, P.E. **Date:** 03/09/2011

To: James George
Assistant Director, Financial Services Group

Copy: Syed Ali

RE: Submittal of a New CIP Project Proposal
Fairview Sewage Pumping Station Modernization-Replace Four Pumps

Attached, for your review and approval, is a new project proposal for inclusion in the Capital Improvement Program (CIP).

The following items are included, as required, in this project proposal submittal:

1. Problem Statement
2. History (Background)
3. Potential Alternative Solutions
4. Operational Benefits of this Proposed Project
5. Financial Benefits of this Proposed Project
6. Preliminary Scope of Work
7. Related Projects Currently Underway or Planned
8. Time Requirements
9. Capital Cost Estimate Work Sheet
10. Present Value / Life Cycle Cost Analysis Work Sheet
11. Identification of In-House Responsibility
12. Reference Materials

If you have further questions, please contact me at 313-964-9880.

Samuel Smalley, P.E.
Assistant Director, Wastewater Operations

Attachment(s)

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM

New CIP 232001

FORMAT FOR SUBMITTING A NEW CIP PROJECT PROPOSAL

Title: FAIRVIEW PUMPING STATION-REPLACE FOUR SANITARY PUMPS

CIP *(Circle One)*: SEWERAGE

PLEASE PROVIDE THE FOLLOWING

1. Problem Statement

The Fairview Sewage Pumping Station (FSPS) was originally built to pump sewage into the Detroit River. The station is now used as a lift station for the Detroit River Interceptor (DRI). The wastewater discharged from the Connor Creek pump station is moved to Fairview via a 9 foot diameter extension conduit. The wastewater flow in the DRI contains both sanitary flow and storm flow. Wastewater contains objectionable substances such as oil, dissolved organic compounds and suspended solids. The existing sanitary pumps move wastewater from the wet well to the DRI where gravity flow goes to the Detroit Wastewater Treatment Plant. The current sanitary pumps were installed in 1950 and are not efficient. New pumps will be more efficient and have lower maintenance costs.

2. History (Background)

FSPS was constructed in 1913 and upgraded in 1950 and 1998. This station serves the Fox Creek district, East Jefferson District, Northeast Wayne County, and Southeast Macomb County. The capacity is 340 million gallons per day (MGD). The discharge channel can handle only 240 MGD. There are no alternate flow schemes to for sewage flow from the four districts served by FSPS.

3. Potential Alternative Solutions (Project Objective)

1 .Replace all four sanitary pumps at FSPS with modern efficient sanitary pumps and motors.
2. Replace only the pumps but use the existing motors to reduce the project cost.

4. Operational Benefits of Proposed Project

Modern up to date designs improve integrity and incorporate features such as split mechanical seals to reduce leakage and maintenance costs.

5. Financial Benefits of Project Proposal

More efficient pumps will reduce energy costs for moving wastewater.

DETROIT WATER & SEWERAGE DEPARTMENT
CAPITAL IMPROVEMENT PROGRAM

FORMAT FOR SUBMITTING A NEW CIP PROJECT PROPOSAL

Continued:

6. Preliminary Scope of Work

Study and design four new pumping systems including inlet and discharge valves plus review wet well hydraulics. Address equipment handling concerns by enlarging doors and adding roadways. Upgrade electrical and lighting systems.

7. Related Projects Currently Underway or Planned

PC-772 Fischer Pumping Station upgrade is progress.

8. Time Requirements

The study phase will take six months from July 2011 to January 2012
The design phase will take six months from January 2012 to July 2012
The construction phase will take two years from July 2012 to July 2014

9. Capital Cost Estimate

Study phase cost is $115,000
Design phase cost is $275000
Construction phase cost is $11,340,000

CIP FISCAL YEAR EXPENDITURES PROJECTIONS

FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	REMAINING	TOTAL
$390,000	$5,500,000	$5,500,000	$340,000	$	$	$11,730,000

10. Present Value / Life Cycle Cost Analysis

The present value calculated for a twenty year life cycle is $13,628,725
The equivalent annual cost of the project is $1,286,455
See attached worksheets for details

11. Identification of In-House Responsibility

The responsible persons will be Mirza Rabbaig 964-9880 and David Metz 964-9861. Mechanical Maintenance Division and Tom Hall 267-3693 will assist.

12. Reference Materials

Operation and Maintenance manual, 1998
PC-684 Fairview Pumping Station Rehabilitation, 1998.

Submitted By: _____ **Date:** 3-9-11

Recommended By: _____ **Date:** 3/9/11

Approved: _____ **Date:** 3/11/11

New CIP 232001

INSTRUCTIONS: **Project Manager must input data in the blue cells.** The white cells are automatically calculated.
COMPLETE THIS PAGE FIRST BEFORE INPUTTING DATA ON PAGE 2

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet

PROJECT TITLE: Fairview Pumping Station Modernization

	Input Data Into Colored Boxes		Period Duration	Line Item #
Study Phase				
Consultant Fee	$0			
In-house Force Account	$115,000			
Sum Total of Study Phase		$115,000	0.5 yrs.	1
Design Phase				
Consultant Fee	$0			
In-house Force Account	$275,000			
Sum Total of Design Phase		$275,000	0.5 yrs.	2
Construction Phase				
Construction Cost				
Civil Items	$150,000			
Mechanical Items	$7,000,000			
Electrical Items	$1,200,000			
Miscellaneous *(Material Costs: wiring, etc.)*	$200,000			
Subtotal Sum	$8,550,000			3
Mobilization & Demobilization Costs: *(3% of Line Item# 3)*	$256,500			4
Subtotal *(Line Items# 3+4)*	$8,806,500			5
G.C./O.H./Profit: *(15% of Line Item# 5)*	$1,320,975			6
Subtotal *(Line Items# 5+6)*	$10,127,475			7
Provisionary/Contingency Allowance: *(10% of Line Item# 7)*	$1,012,748			8
Subtotal **Construction Cost** *(Line Items# 7+8)*	$11,140,223			9
Consultant Fee for Construction Assistance Services	$0			10
In-house Force Account for Construction Phase	$200,000			11
Sum Total of Construction Phase *(Line Items# 9+10+11)*		$11,340,223	2.0 yrs.	12
GRAND TOTAL CAPITAL COST ESTIMATE: *(Line Items# 1+2+12)*		$11,730,223	**3.0 yrs.**	13
		say ***$11,730,000***		

FY	2011-12	2012-13	2013-14	2014-15		Remaining	TOTAL
	$390,000	$5,500,000	$5,500,000	$340,000			$11,730,000

For Information Only

ESTIMATED OPERATIONS AND MAINTENANCE COST NEEDED WITH THIS CONTRACT

(This O&M Amount Is Not Included In The Capital Cost Calculations Shown Above)

FY	2017	2018	2019	$2,020		Remaining	TOTAL
	$50,000	$60,000	$60,000	$70,000		$60,000	$300,000

Revised: February *2010*

INSTRUCTIONS: Project Manager must input data in the blue cells.
The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Present Value/Life Cycle Cost Analysis Worksheet

PROJECT TITLE: Fairview Pumping Station Modernization

(provide information in the blue shaded cells only. All other cells are auto-calculated)

Capital Cost "C"

Design & Installation Cost for the New Equipment

Estimated Study Phase Consultant Fee	$0
Estimated Study Phase Force Account Cost	$115,000
Estimated Design Phase Consultant Fee	$0
Estimated Design Phase Force Account Cost	$275,000
Estimated Construction Cost (Contractor)	$11,140,223
Estimated Construction Phase Assistance Consultant Fee	$0
Estimated Construction Phase Assistance Force Account Cost	$200,000

Sum Total of "Present Value of Capital Cost" Items **C = $11,730,223** Line Item # 1

Study, Design, and Construction Period Interest Value "I"

Total Project Period: n_1 = 3.0 years *(this includes study, design, and construction phases)*

Interest Rate: i = 7.0 % per year

Present Interest Value "I" = ($i*n_1*C)*.5 **I = $1,231,673** Line Item # 2

Annual Operation & Maintenance Cost "A"

	New Equipment	Existing Equipment for Info Only
Operation Labor Cost	$20,000	
Maintenance Labor Cost	$30,000	
Equipment & Services Cost	$10,000	
Energy Cost	$2,000	
Hauling & Disposal Cost		
Cost of Materials		

Sum Total of "Annual O & M Cost" Items $A_{O\&M}$ = $62,000

Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(i*(1+i)^n))$ $P_{O\&M}$ = **$656,829** Line Item # 3

or P=A(P/A,i%,n_2) **where:** i = 0.07 *and* n_2 = 20 yrs.

See Table below for the n_2 years

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)* **S = $10,000** Line Item # 4

Total Present Value of Project of 20 **Year Life** = *(Line Items#1+2+3+4)* **P = $13,628,725** Line Item # 5

Equivalent Annual Cost of the Project "A" = $P*((i*(1+i)^n)/((1+i)^n-1))$ **A = $1,286,455** Line Item # 6

or A = P(A/P,7%,20)

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 232001

CIP #: 1241

Project Title: **Fairview Pumping Station - Replace Four Sanitary Pumps**

Contract Number:

Description: Replacement and upgrade of pumping equipment's to improve transportation of waste water to the treatment plant

Lead Division:

Division Leader:

Project Manager:

Phone:

Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 31,800

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ -	-	$ -	$ 700	$ 14,000	$ 15,000	$ -	$ -	$ -	29,700
617950	Contractual Engineering Service		-	128	-	$ 472	$ 1,400	$ 350	$ 350	$ -	$ -	$ -	2,700
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 128	$ -	$ 472	$ 2,100	$ 14,350	$ 15,350	$ -	$ -	$ -	$ 32,400
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	$ 128	$ -	$ 472	$ 2,100	$ 14,350	$ 15,350	$ -	$ -		32,400
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 128	$ -	$ 472	$ 2,100	$ 14,350	$ 15,350	$ -	$ -	$ -	$ 32,400

PROJECTED (000)

(000)	FY 2016-17 and prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$600	$2,100	$14,350	$15,350	$0	$0	$0	$32,400

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

PROJECT PROPOSAL

Project Title: Sewage Sludge Incinerator Air Quality Improvements at WWTP

CIP: Sewerage

1. Problem Statement

The Detroit Wastewater Treatment Plant (DWWTP) uses the Multiple Hearth Incinerators (MHI) to dispose the majority of biosolids produced at the plant and with the remaining biosolids transported to landfill through the Central Offload Facility. The department struggles to dispose of peak solid quantities due to operational limitations of the landfill. To address this issue, DWSD has proposed a temporary storage of dewatered sludge at the Wastewater Treatment Plant through other CIP Proposal. Currently, Complex I (CI) and Complex II (CII) incinerators are undergoing rehabilitation, under PC-774 contract, to expand their usefulness another 3-5 years. However, the current rehabilitation under PC-774 would not be sufficient to run the Incinerators beyond March 21, 2016 due to the new air quality regulations (Section 129 of the Clean Air Act). Recently, DWSD has conducted the Detroit Biosolids Symposium and invited the biosolids experts and other municipalities. After the conclusion of the symposium, the following strategy was planned for providing biosolids management for the DWWTP.

- Termination for the procurement of PC-781 Contract
- Sludge Incinerator Air Quality Improvements
- Air quality Control Improvement for subject incinerators
- A new Dryer Facility for the WWTP Biolsolids

Due to above mentioned issues, DWSD recognized the need of a primary long-term disposal alternative that would handle the base load biosolids, which constitute the majority of biosolids generated at plant on a daily basis. However, the peak biosolids, in excess of the base capacity, would be processed by the proposed new dryer facility, and remaining offloaded through the existing Central Offload Facility to be landfilled, land applied or other beneficial reuse. In order to expedite the improvement of the CII and limited CI Incinerators to meet the March 21, 2016 New Air Quality Regulations, the project would be advertised soon and delivered through a Design/Build (D/B) contract.

2. History

The DWWTP disposes of dewatered sludge via multiple hearth incinerators and by trucking to landfill and/or land application using the Central Offload Facility. The incinerators at CI and CII have been in operation since the 1940s and 1970s, respectively.

In 2010, DWSD awarded design/build contract PC-774 to do the minor improvements and routine replacement of the incinerator refractory bricks and ancillary equipment, in lieu of the long-term biosolids management of PC-781. The proposed improvements were to expand the life of current incinerators to 3-5 years before PC-781 would be in full operation. Based on recent discussions during the biosolids symposium and advise from the other municipal utilities,

DWSD decided to take the ownership of the biosolids facilities and solicit contractors to provide operations and final disposition of the biosolids using a competitive procurement.

The major rehabilitation for both incineration complexes has been deferred over the years in anticipation of a Synagro Contract and later PC-781, Long-Term Biosolids Management. Besides the rehabilitation work under PC-774, incinerators need major upgrades to meet the new air quality regulations effective on March 2016 in order to continue to be used as the primary method for long-term biosolids disposal.

3. Potential Alternatives Solutions (Project Objective)

The main objective of this project is to provide improvements for Complex I (limited) and Complex II and conveyance systems as a primary method of the sludge disposal. The project would improve the incinerators to meet the new air quality regulations effective March 2016. The other alternative solution would be to build a new Incineration Facility (i.e. Fluidized Bed Incinerators) at the strategic location near the existing complexes, which would be very expensive with major capital cost expenditures.

4. Operational Benefits of Proposed Project

The CI and CII rehabilitation work has been evaluated at different stages from Synagro to proposed fluidized bed incinerators and finally the PC-781 contract. The overall cost for the rehabilitation was always lower compared to the other options while considering the fact that the new air quality regulations would not impact the operations of the Incinerators. The other major factor is ease of operations due to familiarity with the current system.

5. Financial Benefits of Project Proposal

This project will replace the Contract PC-781, Long-Term Biosolids Management. The capital cost for the improvement would be lower than building the new facility for biosolids disposal. The project would complete the necessary improvements to meet the March 2016 new air quality regulations. Timely completion of this project will also avoid potential penalties from EPA and MDEQ.

6. Preliminary Scope of Work

In general, the scope of work for this project involves the design and construction for Dewatering and Sludge Incinerator Air Quality Improvements at Complex I (limited) and Complex II Incinerator facility at DWWTP.

The preliminary scope of this project is to:

- Design and install new scrubber such as "Venturi-Pak"
- Design and install ID fan and Noise Reduction Modifications
- Burner Train Upgrade

- Design and install conveyance system from Complex I to Complex II as necessary to divert flow from Complex I
- Design and install air quality control and monitoring equipment

The work shall be completed in accordance to the new Air Quality Regulations effective from March 2016.

7. Related Projects Completed, Currently Underway or Planned

1. PC-774, Complex I and Complex II Incinerators Rehabilitation
2. CS-1432, Task 17 Biosolids Disposal Alternative Evaluation at DWWTP
3. PC-787, Replacement of Belt Filter Presses at Complex I and Upper Level Complex II

8. Time Requirements

D/B Start:	November 1, 2012
D/B Completion:	July 15, 2016
Final D/B Completion:	December 31, 2016

9. Preliminary Cost Estimates

D/B Cost:	$36,800,000.00
Total:	$36,800,000.00

CIP FISCAL YEAR EXPENDITURES PROJECTIONS

2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Total
$100,000	$2,200,000	$9,700,000	$14,000,000	$8,000,000	$2,800,000	$36,800,000

10. Present Value/ Life Cycle Cost Analysis

Present Value (P) calculated for 20 years Life Cycle for the Incinerators' facilities: $41,932,136

Equivalent Annual Cost of the project: $3,958,097

11. Identification of In-House Responsibility

Design/Build: Wastewater Construction Group, Wastewater Operations Group

Contact persons:

Daniel Schechter	Superintendent of Wastewater Operations
James Urbanik	Plant Manager, Wastewater Operations
Samuel Smalley	Assistant Director, Wastewater Operations

12. Reference Materials:

None

Submitted by: _____ Date 4/24/12
Parvez S. Jafri, P.E.
Head Engineer of Water Systems

Recommended by: _____ Date 4/25/12
Daniel Schechter, P.E.
Superintendent - Wastewater Operations

Approved by: _____ Date 4/26/12
Samuel A. Smalley, P.E.
Assistant Director-Wastewater Operations

INSTRUCTIONS: Project Manager must input data in the blue cells. The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Present Value/Life Cycle Cost Analysis Worksheet

Sewage Sludge Incinerator Air Quality Improvement at WWTP
0

(Provide information in the blue shaded cells only. All other cells are auto-calculated.)

		Alt. "A"	Alt. "B"	Line Item #
Capital Cost "C"				
Design & Installation Cost for the New Equipment				
Estimated Study Phase Consultant Fee		N/A	$0	
Estimated Study Phase Force Account Cost		$0	$0	
Estimated Design Phase Consultant Fee		N/A	$0	
Estimated Design Phase Force Account Cost		$0	$0	
Estimated Construction Cost (Contractor)		$30,682,575	$0	
Estimated Construction Phase Assistance Consultant Fee		$2,350,000	$0	
Estimated Construction Phase Assistance Force Account Cost		$3,750,000	$0	
Sum Total of "Present Value of Capital Cost" Items	**C =**	**$36,782,575**	**$0**	1
Study, Design, and Construction Period Interest Value "I"				
Total Project Period: n_1 = 4 years *(this includes study, design, and construction phases)*				
Interest Rate: i = 7.0 % per year				
Present Interest Value "I" = ($i*n_1*C)*.5$	**I =**	**$5,149,561**	**$0**	2
Annual Operation & Maintenance Cost "A"				
Operation Cost				
Maintenance Cost				
Energy Cost				
Sum Total of "Annual O & M Cost" Items	$A_{O\&M}$ =	$0	$0	
Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(i*(1+i)^n))$	$P_{O\&M}$ =	**$0**	**$0**	3
or P=A(P/A,i%,n_2) **where:** i = 0.07 *and* n_2 = 20 yrs. (See Table below)				

NOTE: the useful life (n_2) is as follows:

n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*	**S =**	**$0**	**$0**	4
Total Present Value (P) of Project of 20 **Year Life** = *(Line Items#1+2+3+4)*	**P =**	**$41,932,136**	**$0**	5
Equivalent Annual Cost (A) of the Project = $P*((i*(1+i)^n)/((1+i)^n-1))$ or A = P(A/P,7%,20)	**A =**	**$3,958,097**	**$0**	6

INSTRUCTIONS: Project Manager must input data in the blue cells. The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet

Sewage Sludge Incinerator Air Quality Improvement at WWTP

	Input Data Into Colored Boxes Alt. "A"	Input Data Into Colored Boxes Alt. "B"	Line Item #
Study Phase			
Consultant Fee	N/A		
In-house Force Account			
Sum Total of Study Phase	**$0**	**$0**	**1**
Design Phase			
Consultant Fee	N/A		
In-house Force Account			
Sum Total of Design Phase	**$0**	**$0**	**2**
Construction Phase			
D/B Cost			
Civil Items	$1,500,000		
Mechanical Items	$16,150,000		
Electrical Items	$3,500,000		
Miscellaneous	$1,950,000		
Subtotal Sum	$23,100,000	$0	3
Mobilization & Demobilization Costs:	$1,155,000	$0	4
Subtotal *(Line Items# 3+4)*	$24,255,000	$0	5
G.C./O.H./Profit: *(15% of Line Item# 5)*.....	$3,638,250	$0	6
Subtotal *(Line Items# 5+6)*	$27,893,250	$0	7
Provisionary/Contingency Allowance:	$2,789,325	$0	8
Subtotal *(Line Items# 7+8)*	$30,682,575	$0	9
Consultant Fee for Construction Assistance Services	$2,350,000		10
In-house Force Account for Construction Phase	$3,750,000		11
(Line Items# 10+11+12)	**$36,782,575**	**$0**	**12**
(Line Items# 1+2+12) ...	**$36,782,575**	**$0**	13

Revised: February, *2012*

CIP 1253
New CIP 213003

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
INTERDEPARTMENTAL MEMO

FROM: Samuel A. Smalley — Date: April 25, 2012

TO: James George, Assistant Director, Financial Services Group — Copy to: D. Schechter, P. Jafri, S. Ali

RE: Submittal of a CIP Project Proposal
Sewage Sludge Incinerator Air Quality Improvements
At Wastewater Treatment Plant (WWTP)

Attached, for your review and approval, is a new project proposal for inclusion in the Capital Improvement Program (CIP).

The following items are included, as required, in this project proposal submittal:

1. Problem Statement
2. History (Background)
3. Potential Alternative Solutions (Project Objective)
4. Operational Benefits of this Project
5. Financial Benefits of this Project
6. Preliminary Scope of Work
7. Related Projects currently underway or planned
8. Time Requirements
9. Preliminary Cost Estimates
10. Present Value/Life Cycle cost analysis work sheet
11. Identification of in-house responsibility
12. Reference Materials

Should you have any questions, please contact me at (313) 297-4300.

Samuel A. Smalley, P.E.
Assistant Director - Wastewater Operations

PJ/SAM

Attachments: Project Proposal

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213003

CIP #: 1253

Project Title: **Sewage Sludge Incinerator Air Quality Improvements at WRRF** **Contract Number:**

Description: Provide sludge incinerations air quality improvements at Incinerator Complex II to meet NPDES Permit requirements

Lead Division: Division Leader:

Project Manager: Unknown Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** X Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ - Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ 33,043	-	$ 3,000	$ -	$ -	$ -	$ -	$ -	$ -	36,043
617950	Contractual Engineering Service		-	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 33,043	$ -	$ 3,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 36,043
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	$ 33,043	$ -	$ 3,000	$ -	$ -	$ -	$ -	$ -		36,043
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 33,043	$ -	$ 3,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 36,043

PROJECTED (000)

(000)	FY 2016-17 and prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$36,043	$0	$0	$0	$0	$0	$0	$36,043

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes | 0 No CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

DETROIT WATER & SEWERAGE DEPARTMENT

CAPITAL IMPROVEMENT PROGRAM

CIP 1254
New CIP 213004

PROJECT PROPOSAL

Project Title: Biosolids Dryer Facility at WWTP

CIP: Sewerage

1. **Problem Statement**

The Detroit Wastewater Treatment Plant (DWWTP) includes: two (2) Multiple Hearth Incinerator (MHI) Complexes I and II; and one (1) Central Offload Facility to dispose the biosolids produced at the plant. The Complex I (6 incinerator Units) installed in the 1940s and the Complex II (8 Incinerators Units) was added in the 1970s. There have been a number of issues that have caused Detroit Water and Sewerage Department to evaluate the long-term biosolids handling that include: (1) the operational condition of the existing, aging, incinerators; (2) the termination of the Synagro contract; (3) new federal air quality regulations affecting the aging incinerators; and (4) the cancellation of PC-781. Due to these issues, and in consideration of the recommendations from the recent biosolids symposium, DWSD has decided to improve the dewatered sludge incinerators to meet new air quality requirements (by a separate contract), and to provide a long-term dryer facility capability for land application and other beneficial use. In addition to the improvements to the existing incinerators, and addition of the new dryer facility, the department is also procuring the design and construction of temporary biosolids storage at the DWWTP due to the capacity limitations of biosolids disposal via landfill or other beneficial use. Currently, Complex I and Complex II incinerators are being rehabilitated under PC-774 to extend their performance another 3-5 years. In addition, Complex I (limited improvements) and Complex II are proposed to have sludge incinerator air pollution control improvements, under a separate design/build contract, to extend their service life by 10-15 years. The following key issues were identified as part of the strategic plan for providing long-term biosolids management for the DWWTP at the conclusion of the symposium:

- Termination of the procurement of PC-781 Contract
- Sludge Incinerator Air Quality Improvements (other)
- Addition of new Dryer Facility at DWWTP.

This dewatering thermal drying option was reviewed before and found to be slightly more expensive than the Fluidized Bed Incinerator (FBI) due to the high energy (natural gas) cost. It was also found that if a low cost energy source is available, the drying method will be cost competitive system with low operations and maintenance cost. In order to meet the regulatory driven schedule and concurrently start operation before March 2016, the project should be advertised for consultant services by early next fiscal year. The method of delivery would be design, bid, and build (DBB) contract.

2. **History**

Historically, the DWWTP disposes dewatered sludge via multiple hearth incinerators and by trucking to landfill and/or land application using the Central Offload Facility. The incinerators at Complex I and Complex II have been in operation since the 1940s and 1970s, respectively. The Central Offload Facility has been in operation since 2005.

In 2004, the solids master plan recommended that long-term biosolids should be handled by Minergy, a company that was later bought by Synagro. Synagro started operations in 2008 and halted its operation in 2009 with the mutual agreement of the City of Detroit. After termination of the Synagro contract, DWSD started biosolids management in two phases. Phase 1 Short-Term Improvement of the Complex I and Complex II incinerators and Phase 2 Long-Term Improvement, which was part of CS-1432, Task 17, Biosolids Disposal Alternatives Evaluation at the DWWTP. A parallel Request for Qualification (RFQ) was also initiated under PC-781. Later PC-781 became the Long-Term Bisolids Management Project.

The major rehabilitation for both incineration complexes has been deferred over the years in anticipation of a Synagro Contract and later PC-781, Long-Term Biosolid Management Project. Besides the rehabilitation work under PC-774, Complex II required major rehabilitation work to meet the new air quality regulations, which will be effective March 2016. On an interim basis Complex II incinerators will be used as the primary method of sludge disposal until the long-term solids disposal plan is implemented.

In 2010, DWSD awarded a design/build contract PC-774 to do the minor improvements and routine replacement of the incinerator refectory bricks and ancillary equipment in lieu of the long-term biosolids management of PC-781. The proposed improvements were to extend the service life of the incinerators 3-5 years, until PC-781 would be in full operation. Following the biosolids symposium and advice from the other utilities, DWSD decided to take ownership of the biosolids facilities and solicit contractors to provide operations and final disposition of the biosolids in a competitive procurement.

3. Potential Alternatives Solutions (Project Objective)

The main objective of this project is to provide a thermal dryer facility at the DWWTP for land application or other beneficial reuse. The project would phase out the Complex I Incinerators in consideration of the new air quality regulations effective March 2016. The other alternative solution would be to build a new incineration facility (i.e. Fluidized Bed Incinerators) at a strategic location near the existing complexes, which would be more expensive to operate and maintain.

4. Operational Benefits of Proposed Project

The addition of the thermal dryer, FBI and other dispose methods were evaluated under CS-1432, Task 17 and also later in the PC-781 contract. The overall cost for the dryer was found to be lower than the other options considering that the byproducts can be utilized for land application. The product of the dryer would be easier to store and handle. The other major factor is ease of operations and maintenance due to lower maintenance requirements of the dryer for mechanical systems.

CIP 1254
New CIP 213004

5. Financial Benefits of Project Proposal

This project will replace Contract PC-781, Long-Term Biosolids Management. The capital cost for the improvement will be offset by the long-term use of this facility in lieu of the higher costs for incineration. The project would allow DWSD to meet current regulatory permit requirements and long-term compliance with the March 2016 new air quality regulations. Timely completion of this project will also avoid potential penalties from EPA and MDEQ.

6. Preliminary Scope of Work

In general, the scope of work for this project involves the study, design and construction for a Dryer Facility at WWTP.

The preliminary scope of this project is to:

- Provide a Thermal Dryer Facility to treat 250 dry ton per day (dtpd)
- Design and install a conveyance system from Complex I to Complex II as necessary to divert flow from Complex I
- Design and install air quality control equipment

Dedication on CIP # 1253

The work shall be completed in accordance to the new Air Quality Regulations effective March 2016. The project will phase out the operation of Complex I.

7. Related Projects Completed, Currently Underway or Planned

1. PC-774, Complex I and Complex II Incinerators Rehabilitation
2. CS-1432, Task 17 Biosolids Disposal Alternative Evaluation at DWWTP
3. PC-787, Replacement of Belt Filter Presses at Complex I and Complex II
4. Sludge Incinerator Air Quality Improvement at WWTP.

8. Time Requirements

Study/Design Start:	December 1, 2012
Study/Design Completion:	November 30, 2013
Construction Start:	March 1, 2014
Construction Completion:	July 31, 2017

9. Preliminary Cost Estimates

Study/Design Cost:	$14,000,000.00
Construction Cost:	$140,000,000.00
Total:	$154,000,000.00

CIP FISCAL YEAR EXPENDITURES PROJECTIONS

2012-13	2013-14	2014-15	2015-16	2016-17	Remaining	Total
$5,000,000	$30,000,000	$50,000,000	$50,000,0000	$15,000,000	$4,000,000	$154,000,000

10. Present Value/ Life Cycle Cost Analysis

Present Value calculated for 20 years Life Cycle for Dryer Facility: $175,000,000
Equivalent Annual Cost of the project: $16,500,000

11. Identification of In-House Responsibility

Design: Wastewater Design Group, Wastewater Operations Group
Construction: Wastewater Construction Group, Wastewater Operations Group

Contact persons:

Parvez Jafri	Head Engineer of Water Systems
Daniel Schechter	Superintendent of Wastewater Operations
James Urbanik	Plant Manager, Wastewater Operations
Samuel Smalley	Assistant Director, Wastewater Operations

12. Reference Materials:

None

Submitted by: _____ Date 4/25/12
Parvez S. Jafri, P.E.
Head Engineer of Water Systems

Recommended by: _____ Date 4/26/12
Daniel Schechter, P.E.
Superintendent - Wastewater Operations

Approved by: _____ Date 4/26/12
Samuel A. Smalley, P.E.
Assistant Director-Wastewater Operations

INSTRUCTIONS: Project Manager must input data in the blue cells. The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet

Biosolids Dryer Facilty at WWTP

	Input Data Into Colored Boxes Alt. "A"	Input Data Into Colored Boxes Alt. "B"	Line Item #
Study Phase			
Consultant Fee		$1,000,000	
In-house Force Account		$175,000	
Sum Total of Study Phase	**$0**	**$1,175,000**	**1**
Design Phase			
Consultant Fee	N/A	$4,500,000	
In-house Force Account		$1,000,000	
Sum Total of Design Phase	**$0**	**$5,500,000**	**2**
Construction Phase			
D/B Cost			
Civil Items	$0	$40,000,000	
Mechanical Items	$0	$50,000,000	
Electrical Items	$0	$12,000,000	
Miscellaneous	$0	$6,000,000	
Subtotal Sum	$0	$108,000,000	3
Mobilization & Demobilization Costs:	$0	$3,240,000	4
Subtotal *(Line Items# 3+4)*	$0	$111,240,000	5
G.C./O.H./Profit: *(15% of Line Item# 5)*.....	$0	$16,686,000	6
Subtotal *(Line Items# 5+6)*	$0	$127,926,000	7
Provisionary/Contingency Allowance:	$0	$12,792,600	8
Subtotal *(Line Items# 7+8)*	$0	$140,718,600	9
Consultant Fee for Construction Assistance Services	$0	$5,000,000	10
In-house Force Account for Construction Phase	$0	$1,500,000	11
(Line Items# 10+11+12)	**$0**	**$147,218,600**	**12**
(Line Items# 1+2+12) ...	**$0**	**$153,893,600**	13

Revised: February, *2012*

INSTRUCTIONS: Project Manager must input data in the blue cells. The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Present Value/Life Cycle Cost Analysis Worksheet

Biosolids Dryer Facilty at WWTP
0

(Provide information in the blue shaded cells only. All other cells are auto-calculated.)

		Alt. "A"	Alt. "B"	Line Item #
Capital Cost "C"				
Design & Installation Cost for the New Equipment				
Estimated Study Phase Consultant Fee		$0	$1,000,000	
Estimated Study Phase Force Account Cost		$0	$175,000	
Estimated Design Phase Consultant Fee		N/A	$4,500,000	
Estimated Design Phase Force Account Cost		$0	$1,000,000	
Estimated Construction Cost (Contractor)		$0	$140,718,600	
Estimated Construction Phase Assistance Consultant Fee		$0	$5,000,000	
Estimated Construction Phase Assistance Force Account Cost		$0	$1,500,000	
Sum Total of "Present Value of Capital Cost" Items	**C =**	**$0**	**$153,893,600**	1

Study, Design, and Construction Period Interest Value "I"

Total Project Period: n_1 = 4 years *(this includes study, design, and construction phases)*

Interest Rate: i = 7.0 % per year

Present Interest Value "I" = ($i*n_1*C)*.5$	**I =**	**$0**	**$21,545,104**	2

Annual Operation & Maintenance Cost "A"

Operation Cost				
Maintenance Cost				
Energy Cost				
Sum Total of "Annual O & M Cost" Items	$A_{O\&M}$ =	$0	$0	
Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(i*(1+i)^n))$	$P_{O\&M}$ =	**$0**	**$0**	3

or P=A(P/A,i%,n_2) **where:** i = 0.07 *and* n_2 = 20 **yrs.** (See Table below)

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*	**S =**	**$0**	**$0**	4
Total Present Value (P) of Project of 20 **Year Life** = *(Line Items#1+2+3+4)*	**P =**	**$0**	**$175,438,704**	5
Equivalent Annual Cost (A) of the Project = $P*((i*(1+i)^n)/((1+i)^n-1))$ or A = P(A/P,7%,20)	**A =**	**$0**	**$16,560,173**	6

CIP 1254
New CIP 213004

DETROIT WATER AND SEWERAGE DEPARTMENT
ENGINEERING SERVICES DIVISION COMMUNICATION
WASTEWATER GROUP

PARVEZ S. JAFRI, P.E.
(313) 297-0200 or (313) 999-2716
jafri@dwsd.org

TO: **D. Schechter/S. Smalley/D. Latimer/ J. George**

DATE: **April 25, 2012**

- ☒ **For Your approval/Signature, please**
- ☐ Per Your Request
- ☐ Per Our Conversation
- ☐ Advise Me Please
- ☐ _____

FROM: Arshed Ramankutty

SUBJECT: **Biosolids Dryer Facility at WWTP**

CIP Approval Request

REMARKS:

APPROVED BY: Parvez Jafri

DATE: 4/25/12

FOR YOUR INFORMATION:

S. McCormick	D. Latimer	S. Smalley	D. Schechter	S. Kuplicki	R. Shukla		

CIP 1254
New CIP 213004

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
INTERDEPARTMENTAL MEMO

FROM: Samuel A. Smalley — Date: April 25, 2012

TO: James George, Assistant Director, Financial Services Group — Copy to: D. Schechter, P. Jafri, S. Ali

RE: Submittal of a CIP Project Proposal
Biosolids Dryer Facility at WWTP

Attached, for your review and approval, is a new project proposal for inclusion in the Capital Improvement Program (CIP).

The following items are included, as required, in this project proposal submittal:

1. Problem Statement
2. History (Background)
3. Potential Alternative Solutions (Project Objective)
4. Operational Benefits of this Project
5. Financial Benefits of this Project
6. Preliminary Scope of Work
7. Related Projects currently underway or planned
8. Time Requirements
9. Preliminary Cost Estimates
10. Present Value/Life Cycle cost analysis work sheet
11. Identification of in-house responsibility
12. Reference Materials

Should you have any questions, please contact me at (313) 297-4300.

Samuel A. Smalley, P.E.
Assistant Director - Wastewater Operations

PJ/SAM

Attachments: Project Proposal

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213004

CIP #: 1254

Project Title: **Biosolids Dryer Facility at WRRF**

Contract Number:

Description: Allows retirement of Complex I Incinerators. Will provide significant cost savings and is the largest biosolids dryer facility in North America

Lead Division:

Division Leader:

Project Manager:

Phone:

Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** X Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 86

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ 134,191	-	$ 1,691	$ 60	$ 26	$ -	$ -	$ -	$ -	135,968
617950	Contractual Engineering Service		-	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ 134,191	$ -	$ 1,691	$ 60	$ 26	$ -	$ -	$ -	$ -	$ 135,968
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	$ 134,191	$ -	$ 1,691	$ 60	$ 26	$ -	$ -	$ -		135,968
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ 134,191	$ -	$ 1,691	$ 60	$ 26	$ -	$ -	$ -	$ -	$ 135,968

PROJECTED (000)

(000)	FY 2016-17 and prior	FY 2017-18		FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$135,882	$60		$26	$0	$0	$0	$0	$135,968

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: [ ] Yes [0] No CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA Great Lakes Water Authority

Project Title	**Water Resource Recovery Facility (WRRF), Lift Station & Wastewater Collection System Allowance (CIP - 1257)**
Project Significance	This is an allowance for unplanned critical projects, equipment replacement/rehabilitation, critical asset replacement to execute small capital projects (SCP) at WRRF and WW operations

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **4/13/2017** **Project Origin** O&M Request

Project Manager/Sponsor	Beena Chackunkal, P.E.	Engineer	WWOG-Engineering
	Beena.Chackunkal@glwater.org		297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Ravi Yelamanchi	Engineer	Wastewater Design	297-5965	Ravi.Yelamanchi@glwater.org

Site Name	WRRF, Collection System, and CSFO Facilities
If Facility, Facility Address	Various Wastewater Facility Locations
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Wastewater System wide
Previous Project Status	Active
Current CIP Project Status	Active Ongoing

2. PROJECT INFORMATION

Project Photo & Map

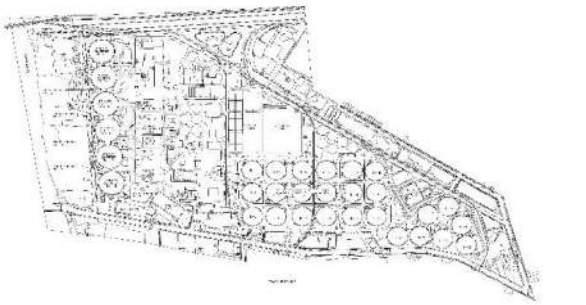


Photo Caption

Map of the WRRF

Map of the collection system and Combined Sewer Overflow Retention Basins and Screening Disinfection Facilities.

Problem Statement	The recent asset audits and needs assessment study report have identified many small capital projects to assist future planning and execution of rehabilitation/ replacement projects for all WRRF facilities, of electrical equipment, I & C and network devices, roads and buried infrastructure. The needs assessment study report and SRP report is the requirement for WRRF facilities for NPDES permit and renewals. The planned small capital projects <$1 M utilize this CIP budget. At present construction of two small capital projects has been identified to be utilized from CIP# 1257 budget: (a) SCP-PC-014, Plantwide Replacement of Emergency Lighting and Exist Signs. The construction budget for this projects is $1,178,743. The NTP was issued on 12/2/2016 and the Final Completion Date is 12/27/2017. (b) SCP-PC-016G, Replacement of Flow Meter at Neff Road Pumping Station. This project has recently been completed in March 2017. WWD group have closed this project a last invoice may still be in the processing stage.
History / Background	WRRF has audited twice in past for all equipment and supporting facilities, considered to maintain process. These audits helped to assess equipment repair and future planning and execution of rehabilitation/replacement projects at WRRF facilities
Preliminary Scope of Work	The Needs Assessment Study Report and SRP report have developed preliminary scope for these small capital projects. The scope includes replacement of key equipment, rehabilitation, repair and maintenance of facilities.

Related projects currently underway or planned	At present 2 capital projects has been identified to be tapped for CIP#1330 budget: (a) SCP-PC-014, Plantwide Replacement of Emergency Lighting and Exist Signs. The construction budget for this projects is $1,178,743. The NTP was issued on 12/2/2016 and the Final Completion Date is 12/27/2017. (b) SCP-PC-016G, Replacement of Flow Meter at Neff Road Pumping Station. This project has recently been completed in March 2017.
Potential Challenges	Depending on type of project, long term or short term projects equipment or part of process areas need to shut down.
Other – important project information, photos, etc. not fitting in other	GIS, Section Maps and Gate Books are available for reference

Additional Reference Documents: Use button below or include file path to network location.

Based on recommendations from Needs Assessment Study Report and SRP report replacement of key process equipment, electrical equipment, I&C, network devices, roads and buried infrastructure be replaced.

3. PROJECT DRIVER

Primary criteria driving project 2 - Performance (Service Level/Reliability)

Explanation To reduce equipment and process down times of critical assets

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate	4/13/2017	**Prepared By**	Wastewater Design Group	**Division**	Wastewater Operations

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, and Const. Assist.	In Proposed CIP	$0	$2000	$2000	$2500	$2500	$2000	$0	$11,000	Phase Duration
Construction	In Proposed CIP	$0	$9421	$10000	$12500	$12500	$10000	$0	$54,421	Phase Duration
Construction SCP-PC-014	In Proposed CIP	$600	$579	$0	$0	$0	$0	$0	$1,179	Phase Duration
Construction SCP-PC-016G	In Proposed CIP	$432	$0	$0	$0	$0	$0	$0	$ 432	Phase Duration
Year Totals		$1,032	$12,000	$12,000	$15,000	$15,000	$12,000	$ 0	**$67,032**	Project Duration

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration

Choose/add phase.	Select Status of Work	$0	$0	$ 0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$	$ 0	Phase Duration
Year Totals		**!C4 Is Not In Table**	**!D4 Is Not In Table**	**!E4 Is Not In Table**	**!F4 Is Not In Table**	**!G4 Is Not In Table**	**!H4 Is Not In Table**	**!I4 Is Not In Table**	!J4 Is Not In Table	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Cost effective and trade off analysis for equipment replacement alternative be performed to make recommendation
Description of Alternative Evaluation	a) Most of the large equipment replacements will be addressed through the CIP Projects and some medium size equipment replacement, rehabilitation, and unplanned facility restoration needs will be addressed under Small Capital Projects b) Needs Assessment Study Report identified small capital improvement needs and SRP Data base history will be utilized for reference manual for equipment's operational life and rehabilitation/replacement.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Equipment status- evaluation for repair and replacement
2) Performance (Service Level / Reliability)	3	Optimize the equipment operation uptime
3) Regulatory (Environmental / Legal)	3	NPDES permit mandates facilities to be in good operating condition to meet permit requirements.
4) O&M	4	This planned Operation and Maintenance activity
5) Public Health & Safety	3	Equipment down leads to permit violations and degradation of environment for public health at risk.
6) Public Benefit	3	Improved air emissions and water quality effluents.
7) Financial	3	O&M cost savings
8) Efficiency	4	SRP will replace inefficient with more efficient and easy to maintain equipment increasing operational efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	3	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	3	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	3	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	3	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	4/13/2017	Document updated

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal, P.E.	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 260100

CIP #: 1257

Project Title: **Wastewater Treatment Plant, Lift Station and Wastewater Collection System Structures Allowance**

Contract Number:

Description: Funding required for unplanned and critical small capital projects in the entire wastewater system

Lead Division:

Division Leader:

Project Manager: Unknown

Phone:

Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 66,000

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-	$ -	-	$ 5,587	$ 10,000	$ 10,000	$ 12,500	$ 12,500	$ 10,000	$ -	60,587
617950	Contractual Engineering Service		-		-	$ -	$ 2,000	$ 2,000	$ 2,500	$ 2,500	$ 2,000	$ -	11,000
Jill: Need GL Code	Materials		-										-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 5,587	$ 12,000	$ 12,000	$ 15,000	$ 15,000	$ 12,000	$ -	$ 71,587
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-	$ -	$ -	$ 5,587	$ 12,000	$ 12,000	$ 15,000	$ 15,000	$ 12,000		71,587
Sewer I&E			-				-	-	-	-			-
	Project Total		$ -	$ -	$ -	$ 5,587	$ 12,000	$ 12,000	$ 15,000	$ 15,000	$ 12,000	$ -	$ 71,587

(000)	FY 2016-17 and prior	FY 2017-18	PROJECTED FY 2018-19	FY 2019-20	(000) FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$5,587	$12,000	$12,000	$15,000	$15,000	$12,000	$0	$71,587

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**Sewer and Interceptor Evaluation and Rehabilitation Program – CIP 1263**
Project Significance	Evaluation of the existing condition of the sewers and interceptors, cleaning and rehabilitating are essential to optimize the transportation capacity of the GLWA collection system and to increase its life expectancy.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **4/12/17** **Project Origin** Condition Assessment

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	Sewers and Interceptors
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Construction
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.

Include caption for the map. Map is especially important for linear assets.

Problem Statement	As per the NPDES permit, GLWA is required to utilize the available sewage system transportation capabilities, to the maximum extent possible, for the delivery of combined sewage to the treatment facilities. Recent inspections of portions of interceptors and selected trunk sewers suggest that there were significant sludge deposits and mineral deposits throughout. These deposits partially block the sewers and reduce the transportation capacity and can eventually lead to untreated sewer overflows to the receiving waters. To minimize untreated discharges and to keep the transportation capacity to the maximum we are in need of frequent inspection and maintenance of the collection system. This project will help us to evaluate the existing conditions and will further assist in rehabilitating and or replacing portions with structural deficiencies.
History / Background	The installation of some of these interceptors and sewers are dated back to 1912 under various contracts. Detroit River Interceptor inspection was recently completed in 5 different phases and there were portions deteriorated with visible surface aggregates, attached encrustation and infiltration. Some trunk sewer inspection revealed sludge deposition with reduced transportation capacity. Inspections of sewers to reveal the existing conditions are necessary and shall be done every 5 to 7 years.

	Recommendations from these inspections may reveal further need for cleaning, rehabilitation or replacement.
Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Provide CCTV and or sonar inspection of the GLWA Collection System Interceptors and Trunk Sewers to reveal the existing conditions as per the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment Certification Program (PACP) standards, evaluate the existing conditions, and provide the necessary cleaning/rehabilitation/replace to optimize the design capacity of the collection system and to minimize the inflow and infiltration into the collection system.
Related projects currently underway or planned	GLWA - CS-068, DWSD - DWS-889, DWSD-DWS-876, DWSD-DWS-901
Potential Challenges	Very large sewers and interceptors may have flow control challenges for both inspection and rehabilitation.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	Some sewers have sediment deposits that results in transportation capacity limitation. Some have deterioration.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.
Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 10/10/2016 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	Not yet started	$0	$218	$240	$600	$600	$600	$0	$2,258	5 Yr.
Design	Not yet started	$0	$400	$400	$1,000	$1,000	$1,000	$0	$3,800	5 Yr.
Construction	Not yet started	$0	$5,360	$7,360	$18,400	$18,400	$18,400	$0	$67,920	5 Yr.
S,D,C (CS-068)	Not yet started	$2,464	$2,000	$0	$0	$0	$0	$0	$4,464	1 Yr.
S,D,C (PO-5030)	Under Procurement	$148	$22	$0	$0	$0	$0	$0	$170	1 Yr.
Year Totals		$2,612	$8,000	$8,000	$20,000	$20,000	$20,000	$ 0	**$78,612**	5 Yr.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$	$	$	$	$	$	$	$ 0	XX Years
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	XX Years

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Do Nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	NA

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate replacement or rehabilitation required since some are missing and existing ones exceeded their service life.
2) Performance (Service Level / Reliability)	4	Likelihood of serious inconveniences and business impacts for affected customers.
3) Regulatory (Environmental / Legal)	4	Compliance failure would result in environmental impact.
4) O&M	3	Reduction in reactive maintenance activities.
5) Public Health & Safety	3	Project will have a moderate positive impact on public health and safety and environment
6) Public Benefit	4	Not implementing the project will have a chance to have a major negative public impact
7) Financial	4	Likely to have wide budget implication if there is a collapse
8) Efficiency	2	Project will have little or no time and cost saving

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	Score 0-5	0.00	Not scored by CIP Committee
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	Not scored by CIP Committee
3) Regulatory (Environmental / Legal) 18%	4	Score 0-5	0.00	Not scored by CIP Committee
4) O&M 11%	3	Score 0-5	0.00	Not scored by CIP Committee
5) Public Health & Safety 17%	3	Score 0-5	0.00	Not scored by CIP Committee
6) Public Benefit 8%	4	Score 0-5	0.00	Not scored by CIP Committee
7) Financial 10%	4	Score 0-5	0.00	Not scored by CIP Committee
8) Efficiency 9%	2	Score 0-5	0.00	Not scored by CIP Committee
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia, Manager Mini Panicker, Engineer Thomas Hall, Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker	10/11/2016
	Mini Panicker	
Manager	Biren Saparia	10/11/2016
	Biren Saparia	
Chief	Cheryl Porter	10/11/2016
	Cheryl Porter	

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 260200

CIP #: 1263

Project Title: **Sewer & Interceptor Evaluation and Rehabilitation** **Contract Number:**

Description: Evaluate, clean and rehabillitate GLWA Waste Collection Systems

Lead Division: Division Leader:

Project Manager: Mini Panacker Phone: 313-267-8996 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 76,000 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	44	44	110	110	110	-	419
601997	Capital Allocation: Fringe Benefits	40%	-				18	18	44	44	44	-	168
601998	Capital Allocation: Nonpersonnel	5%	-				2	2	6	6	6	-	21
616900	Construction		-				5,296	7,296	18,240	18,240	18,240	-	67,312
617950	Contractual Engineering Service		-			2,612	2,640	640	1,600	1,600	1,600	-	10,692
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 2,612	8,000	8,000	20,000	20,000	20,000	-	78,612

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-												-
Sewer Construction Bonds	-			2,612	8,000	8,000	20,000	20,000	20,000	-	78,612
Sewer I&E	-												-
Project Total	$ -	$ -	$ -	$ 2,612	$ 8,000	$ 8,000	$ 20,000	$ 20,000	$ 20,000	$ -	$ 78,612

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17 and Prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$2,612	$8,000	$8,000	$20,000	$20,000	$20,000	$0	$78,612

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: August 2, 2016

GLWA
Great Lakes Water Authority

Project Title	**Complex I Incinerators Decommissioning and Re-Usability (CIP 1284)**
Project Significance	This project will decommission the C-I Incinerators building.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/29/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Beena Chackunkal	Engineer	WDG
	BeenaChackunkal@glwater.org		(313) 297-9825
CMG Rep	Monica Daniels	Manager	Finance
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Jason Williams	Engineer	WDG	(313) 297-0230	Jason.Willliams@glwater.net

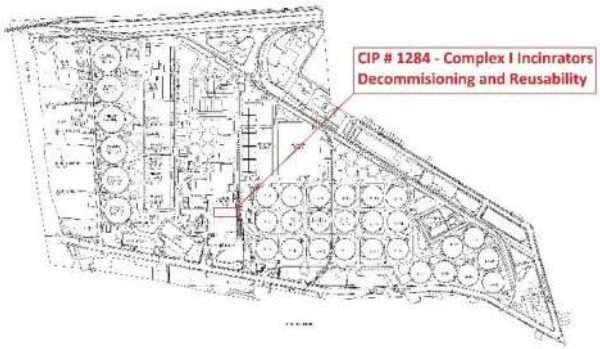
Site Name	WWTP Incineration Complex I
If Facility, Facility Address	9300 West Jefferson
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Wastewater Treatment Plant
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Complex – I Incinerator Building at the WWTP



Complex I Incinerators map at the WWTP

Problem Statement	WWTP includes two multiple hearth incinerator complexes I and II. Complex I was installed in the 1940's. Due to new EPA air quality regulations DWSD initiated the new Bio-solids Dryer Facility. Complex I will be phased out and closed. Complex I will be decommissioned through this proposed new project. The demolition cost and construction assistance, and relocation of utilities is not included in this budgeted CIP. The budgeted CIP includes study, design and minimum rehabilitation to install heating to continue utilizing the building other than incinerations.
History / Background	Complex I was installed and in operation since the 1940's and has completed its valuable life cycle. The Bio-solids Alternatives Evaluation at the WWTP evaluated several options for long-term dewatering disposal as it relates to overall, and more specifically, the Complex I Incinerator Facility. Most of the options indicated that a long-term phasing out of Complex I especially due to its aged equipment and challenges of meet regularity requirements.
Preliminary Scope of Work	The preliminary scope of this project is to: Provide basis of design report for decommissioning of the Complex-I demolition and relocation drawings for existing pass on utilities. Provide recommendation for future reusability plan for Complex I. The demolition cost and construction assistance, and relocation of utilities is not included in this budgeted CIP. The budgeted CIP includes study, design and minimum rehabilitation to install heating to continue utilizing the building other than incinerations. The cost to demolish equipment and

	rehabilitate the existing building for reuse is very high and further capital investment is deferred until reuse need of this building is well defined.
Related projects currently underway or planned	i.e., This project is step 2 of RRO2, or associated with Work Request or Work Order XXXX.
Potential Challenges	Possible challenges with this project will include shutdowns of the secondary water system and abatement of asbestos and lead for this building built 1940's. Some utility service lines may be shared with adjoining Complex II Incinerator and Complex I Dewatering.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	3 - Regulatory (Environmental/Legal)
Explanation	Due to new EPA regulations and cost issues this facility will need to be phased out.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 7/12/2016 **Prepared By** Jason Williams **Division** WDG

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
S/D/C/CA	Not yet started	$0	$100	$0	$0	$0	$0	$0	$ 100	1 Years
S/D/C/CA	Not yet started	$0	$800	$200	$0	$0	$0	$0	$1,000	2 Years
Year Totals		$ 0	$ 900	$ 200	$ 0	$ 0	$ 0	$ 0	**$1,100**	2 Years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$	$	$	$	$	$	$	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$	$	$	$	$	$	$	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Phase Duration

Double-click here to update table calculations

Notes

Original budget in 2017 CIP for this project was $3M, it has been reduced to $1.1 M. $100K is minimum upgrade to keep it going until Complex-II is in services. The current CIP Budget $1 M is for decommissioning for Complex-I Incinerator.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	**Demolish and build a new building.**
Description of Alternative Evaluation	The alternative to decommissioning the existing Complex-I Incinerator building is demolish and renovate existing building for utilization. To demolish an existing equipment and renovation of this building will require over $10 M in capital investment. The cost of this alternative to demolish equipment and rehabilitate the existing building for reuse is very high and further capital investment is deferred until reuse need is well defined.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance
Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Exiting incinerators are in bad condition
2) Performance (Service Level / Reliability)	3	They will not meet air emissions requirements.
3) Regulatory (Environmental / Legal)	3	They will not meet air requirements.
4) O&M	3	Space needed for other processes.
5) Public Health & Safety	3	This will improve air quality
6) Public Benefit	3	Improved air quality.
7) Financial	3	Cost effective utilization of space.
8) Efficiency	3	Cost effective utilization of space.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	1	2.40	Not problems with the pipe condition
2) Performance (Service Level / Reliability) 15%	3	3	9.00	Meets requirements
3) Regulatory (Environmental / Legal) 18%	3	1	3.60	Minimal impact
4) O&M 11%	3	3	6.60	Some O&M required to resolve problem
5) Public Health & Safety 17%	3	1	3.40	Minimal impact
6) Public Benefit 8%	3	1	1.60	Minimal public benefit
7) Financial 10%	3	2	4.00	Limited impact
8) Efficiency 9%	3	3	5.40	Look at heat recovery
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**36.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	8/15/2016	Document created.

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213005

CIP #: 1284

Project Title: **Decommission Complex 1 Incinerators for Re-Usability**

Contract Number:

Description: Study, design and build Complex 1 for continued use other than incineration. Must no longer use Complex 1 incineration per EPA Air Quality regulations but GLWA wishes to continue to use of the building by heating it and repurposing it.

Lead Division:

Division Leader:

Project Manager: Beena Chackunkal

Phone: 313 297 9825

Department Charged: Water

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Sewage Design Build **(DB)** Both Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 1,100

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	3	1	-	-	-	-	3
601997	Capital Allocation: Fringe Benefits	40%	-				1	0	-	-	-	-	1
601998	Capital Allocation: Nonpersonnel	5%	-				0	0	-	-	-	-	0
616900	Construction		-				818	182	-	-	-	-	1,000
617950	Contractual Engineering Service		-				78	17	-	-	-	-	95
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	900	200	-	-	-	-	1,100
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-			-	900	200	-	-	-	-	1,100
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 900	$ 200	$ -	$ -	$ -	$ -	$ 1,100

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17 and Prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$900	$200	$0	$0	$0	$0	$1,100

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA Great Lakes Water Authority

Project Title	**Relocation of Industrial Waste Division and Analytical Laboratory Operations (CIP 1285)**
Project Significance	Permit requirements, continued operation of IWC and Lab, lease term for analytical laboratory, meet site relocation and underutilized WWTP NAB

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **8/2/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Beena Chackunkal, P.E.	Engineer	WWOG-Engineering
	Beena.Chackunkal@glwater.org		297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Ravi Yelamanchi	Engineer	Wastewater Design	313-297-5965	Ravi.Yelamanchi@glwater.org

Site Name	New Administration Building
If Facility, Facility Address	9300 W. Jefferson Ave., Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Construction
Primary Focus	Facility Relocation
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.

Problem Statement	As GLWA enforce Industrial Pretreatment Program (IPP), regulates the discharge wastewater from commercial and industrial sources form Detroit and suburbs. Operation of IWC should continue in future and also current location at Livernois Center Building needs to relocate due to new Bridge Construction starting at end of 2016 between US and Canada. Analytical laboratory performs analytical testing and supports IPP, located at MCHT facility on Second Avenue. Currently this facility under lease terms, and also this building old, needs rehabilitation Therefore studies were conducted for accommodation of relocating IWC and analytical Laboratory to various location of GLWA sites, and feasible site to locate both units to New Administration Building, WWTP. This proposed CIP budget is for construction only. The design and construction assistance services are budgeted through Sigma As Needed Engineering Services Contract CS-1481, Task #22.
History / Background	IWC at separate facility, operates under permit mandated and protect plant from harmful wastewater release to river. Analytical laboratory supports IWC at lease facility at 2nd Ave, which is aged and need refurbishment soon.
Preliminary Scope of Work	Industrial Waste Control Building and Analytical Lab need to be relocated to New Administration Building at WWTP location.
Related projects currently underway or planned	None

Potential Challenges	May require shut down of control and laboratory redesign on 3rd FL NAB.
Other – important project information, photos, etc. not fitting in other	GIS, Section Maps and Gate Books are available for reference.

Additional Reference Documents: Use button below or include file path to network location.

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	3 - Regulatory (Environmental/Legal)
Explanation	Length and re organization is yet established

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source	Opinion Of Cost				
Date of Cost Estimate	8/2/2016	**Prepared By**	Wastewater Design Group	**Division**	Wastewater Operations

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Construction	Not yet started	$0	$5000	$2000	$0	$0	$0	$0	$7,000	2 Years
Year Totals		$0	$5000	$2000	$0	$0	$0	$0	**$7,000**	2 Years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$ 0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Phase Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Cost effective and trade off analysis shows Option b) alternative
Description of Alternative Evaluation	**a) New Construction for Laboratory and IWC Functions b) Relocation and renovation of space for laboratory with and without the IWC function ot 3rd fl WWTP NAB**

	c) Relocation and renovation of space for laboratory with and without the IWC function to the 4th fl WWTP NAB
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate relocation required for both IWC and Lab
2) Performance (Service Level / Reliability)	4	Need of new lab and equipment
3) Regulatory (Environmental / Legal)	5	NPDES and permit mandated regulations.
4) O&M	4	This is critical to the operation of the Lab
5) Public Health & Safety	4	Not relocating IWC will legal action from new bridge construction and expensive lab lease and rehab
6) Public Benefit	3	Project has a moderate impact on the public and GLWA's overall public image
7) Financial	3	Unlikely to have wide budget implication
8) Efficiency	4	Project will have a major impact on improving the underutilized NAB Facilities
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	3	7.20	Current condition moderate
2) Performance (Service Level / Reliability) 15%	4	2	6.00	Meets requirements
3) Regulatory (Environmental / Legal) 18%	5	3	10.80	Legal obligations, HAVE to move
4) O&M 11%	4	2	4.40	Limited impact
5) Public Health & Safety 17%	4	2	6.80	Limited positive impact
6) Public Benefit 8%	3	3	4.80	Get the Gordie Howe bridge constructed; economic development
7) Financial 10%	3	3	6.00	Savings from rent; reimbursement from state
8) Efficiency 9%	4	3	5.40	Moderate impact. Right-size the system, co-locating
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**51.40**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	10/12/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal, P.E.	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

New CIP 214001

GLWA Authority Program

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1285

Project Title: **Relocate Industrial Waste Water Division and Analytic Laboratory Operations**

Contract Number:

Description: Must relocate due to new Bridge to Canada and the analytic lab needs rehabilitation. Plan to Move to WTTP.

Lead Division:

Division Leader:

Project Manager: Beena Chackunkal

Phone: 313 297 9825

Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 7,000

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	-	-	-	-	-	-	-
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-				5,000	2,000	-	-	-	-	7,000
617950	Contractual Engineering Service		-				-	-	-	-	-	-	-
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	5,000	2,000	-	-	-	-	7,000

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-			-	-	5,000	2,000	-	-	-	-	7,000
Sewer I&E		-											-
	Project Total	$ -	$ -	$ -	$ -	$ -	$ 5,000	$ 2,000	$ -	$ -	$ -	$ -	$ 7,000

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$5,000	$2,000	$0	$0	$0	$0	$7,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA Great Lakes Water Authority

Project Title	**Intercommunity Relief Sewer Modifications in Detroit Oakwood District (CIP 1286)**
Project Significance	In lieu of implementing previously planned relief sewer modifications in the Oakwood District largely deferred due to Detroit's financial hardship case, this project address the district's hydraulic transport capacity deficiencies given changed demographics, land uses and intercommunity service needs. This project will validate the recent study, design and construction to alternative wet weather relief sewer modifications to mitigate historical basement and street flooding to provide increased flow transport and treatment for economic benefit of effected intercommunity regional customers. This project will be on hold until the completion of wastewater master plan recommendation.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/29/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater Design
	Beena.Chackunkal@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Finance
	Monica Daniels		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Gary Stoll	Engineer	Wastewater Design Group	(313) 297-6402	gary.stoll@glwater.org

Site Name	Detroit Oakwood District
If Facility, Facility Address	Multiple Locations
Service Area	Wastewater Operating Services
Project Category	CSO Facilities
Project Type	Study, Design and Construction
Primary Focus	Increased wet weather flow transport, treatment and flood mitigation
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

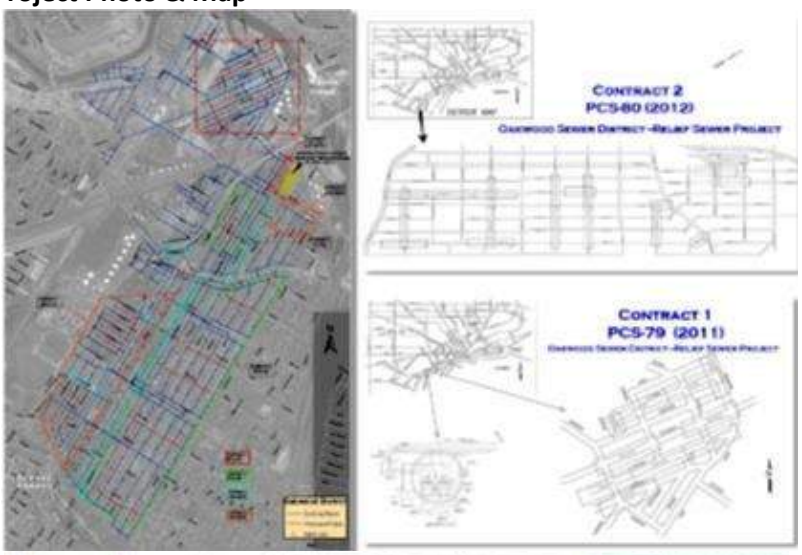
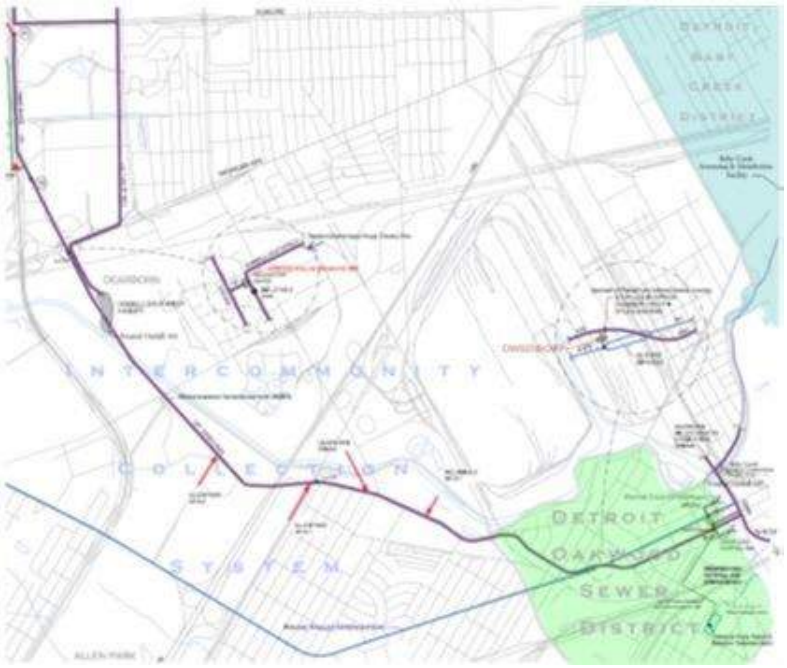


Photo Caption

Aerial photo, far left, of Oakwood Sewer District depicting previously designed relief sewers tributary to Oakwood Pump Station and CSO Retention Treatment Basin. Part of the planned relief sewers and associated hydraulic structures were constructed between 2010- and 2012 under Contracts PCS-79 and PCS-80 (see site plans of this contract work, left).



Partial regional map, left, of Intercommunity Collection System including Oakwood Sewer District (partially shown) depicting sanitary and wet weather flow connections (red arrows) to GLWA's Northwest Interceptor (NWI)—including tributary flows transported in Wayne County's Rouge Valley Interceptor (RVI). Both the NWI and RVI transport tributary flows onward to GLWA's Detroit Wastewater Treatment Plant (DWWTP) through siphoned sewer connections beneath the Rouge River to GLWA's Oakwood Northwest Interceptor (ONWI).

Problem Statement	To continue the previously designed and partly implemented drainage relief system plans to reduce the potential of sewer surcharging and basement/street flooding under peak wet weather in the District and beyond, this project shall perform extended conditional surveys, site evaluations, design revised sewer improvements, and implement (construct) favorably recommended (and budgeted) alternative drainage plans to better manage combined wet weather flow transport to the Oakwood Pumping Station and CSO Retention Treatment Basin for storage and intermittent discharge to Rouge River from Outfall 109 via O'brien Drain and to otherwise efficiently convey residual and sanitary flows to the

Detroit Wastewater Treatment Plant (DWWTP). As well, these alternative plans shall include provisions (conditional project funding) for the design and implementation of select sewer separation and new separate storm sewer systems in lieu of combined sewers prevalent throughout much of the District, where proven practicable. Cost beneficial green infrastructure approaches will also be integrated into projects that emerge associated with these sewer alternative drainage plans.

For more than decade and particularly in recent years since the economic downturn, the District has experienced significant demographic change largely due to blight and hundreds of abandoned residential/commercial properties--many subsequently acquired and demolished by the City and the Marathon Oil Company. To date, Marathon has acquired more than 250 such parcels and other vacated land, primarily in the Oakwood Heights portion of the District (north of I-75, see map above), and converted these into green buffer space that promotes the natural retention and evapotranspiration of storm water runoff and otherwise reduces the volume and rate of conveyance of runoff into combined sewers which, in turn, can preserve the available (peak) transport capacity in tributary lateral and trunk sewers during extreme rainstorms (and during periods of rapid snowmelt) to therefore lessen the occurrences of surcharging and flooding within portions of the District.

Because of this, the previously planned and designed Liddesdale Interceptor and remaining associated relief sewer projects (Contract 3 and Contract 4, respectively, illustrated in aerial photo, above) were deferred pending further feasibility study. As addressed above, this project shall: a) perform such study to reanalyze the changed District's and upstream community's/districts hydraulic transport capacity needs, and b) design and implement favorably recommended (budgeted) alternative drainage and relief sewer systems to provide safe and reliable service and cost effective relief to prevalent surcharging and flooding issues experienced for existing and anticipated future customers consistent with contract capacities and applicable regulatory requirements.

This second relief sewer is recommended by recent study under As Needed Engineering Services Contract CS-1482, Task-I (Recommendations - Project 4) by Applied Science completed on 02/26/2016. The proposed project scope include validation of study, design, construction assistance and construction. This CIP-1286 budget includes validation of study, design and construction budget for 13 ft diameter second influent sewer/tunnel and 440 ft in length from intersection of Liddesdale and Pleasant St interconnecting with existing sewers through a new junction chamber up to Oakwood PS. This project will be on hold until the completion of wastewater master plan recommendation.

History / Background

The Oakwood District is located in the southwest portion of the City of Detroit covering an area of 1,520 acres. In general, it's bound within by a continuous stretch of the northerly and westerly bank of the Rouge River, thence stretches of the city limits of River Rouge and Ecorse to the south, thence a stretch of the city limits of Lincoln Park to the far lower west (abutting a stretch of Outer Drive near

the adjacent watercourse of Ecorse Creek further west), thence a stretch of the city limits of Melvindale to the north near I-75 (between Outer Drive and Schaefer Hwy), thence a continued stretch of city limits of Melvindale to the upper west abutting Schaefer Hwy (between I-75 and the point of beginning along southerly embankment of the Rouge River adjacent Mellon Ave.

Much of the District was originally platted as Oakwood Village, later annexed to the City of Detroit. Some areas of the District are situated in relatively low-lying, flood prone topographies. Much of the combined sewer drainage system was originally designed and built since the 1930's with laterals and larger trunk and intercepting sewers tributary to the former (and present replacement) Oakwood Pumping Station situated near the intersection of Sanders and Liddesdale Street. In early years, combined sanitary and intercepted storm runoff flow drained to that pump station was coarsely screened, pumped (lifted) and, in turn, conveyed though two discharge conduits tributary to a segment of O'brien Drain--a natural and man-made (modified) stream confluent to the Rouge River--without further treatment.

Whereas much of the remaining area of the District, predominantly that north of Fort Street and east of Schaefer highway (a/k/a Oakwood Heights), is situated on relatively higher terrain. Originally, good portions of this area4 connected to public sewers drained to other streams or outfalls tributary to the Rouge and otherwise drained to the original municipal wastewater treatment plant in Detroit via other lateral, trunk and intercepting sewers tributary to an original 24" siphon connection constructed beneath the Rouge River just south of the Fort Street bridge to the city's 12'-9" Oakwood Interceptor also constructed in the 1930's extending from the WWTP, largely paralleling the Rouge River to a point ending just north of Fort Street beneath Miller Road.

In the 1940's, a 3'-0" sewer was constructed from the original pump station's discharge channel which proceeded northerly beneath Sanders St and thence easterly beneath Fort St to a drop shaft hydraulic structure at below intersection at Bayside St in turn connected with a 24" siphoned sewer running easterly beneath the Rouge River and connecting with a downstream hydraulic connection to the City's 12'-9" Oakwood Interceptor (later renamed Oakwood Northwest Interceptor, or ONWI) tributary to the WWTP (originally built in the 30's and placed into operation in early 40's) to primarily convey pumped sanitary (dry weather) flow from the southerly portion of the District to the treatment plant. Continued sewer modifications in the District promoted the interception and routing of combined flows in other areas underserved to the pump station via larger intercepting sewers constructed along Pleasant, Sanders and elsewhere connecting with the main Liddesdale Interceptor—the primary influent sewer to pump station.

In the 1950's, to meet increased service needs in the far western sewer districts of the City of Detroit and neighboring communities of Wayne County and otherwise mitigate increased public health risks, the county (with endorsements from a coalition of these municipalities) commissioned construction of the 10'-0" cylinder

Northwest Interceptor (NWI). The NWI was constructed in segments, phased over 10 years. Its alignment generally extends 15 miles northwest from its terminus near Fort and Bayside within the Oakwood District --largely following the original watercourse of main trunk of the Rouge thence northerly beneath the Southfield Freeway (M-39) to a connection with the tributary 7'-6" cyl Ford Road intercepting sewer—which transports upstream drainage from Detroit's Rouge River District as well as drainage from several hydraulically-connected suburban communities. The NWI's transport capacity, although initially sized to convey wet weather flows resulting up to the typical 10-year uniform rainstorm simulated across the collection system, contributes to ¼ or more of all annual tributary influent flows to the WWTP, on average—depending on prevailing transport capacities along its extensive run as well as limited transport capacities within the downstream ONWI.

It should be recognized that the sole hydraulic-connection from the Oakwood Sewer District for drainage to the NWI is via a drop manhole connection of the aforementioned 36" sanitary discharge main leading from the new (replacement) Oakwood pump station and integral CSO retention treatment basin built in 2011 (PC-755). This connection, which is located beneath Fort St just upstream of the above-mentioned 1950's hydraulic drop shaft structure located at Fort at Bayside with a connected 6'-3" siphon to the ONWI. For more information on Oakwood District refer to Section 2.4 of the linked Description of Sewer Service Districts from the 2003 Wastewater Master Plan, some subject to revisions, since the Oakwood Pump Station and CSO Control Facility was constructed in 2011. Also for further reference, refer to linked Oakwood District Sewer Maps.

Prior Drainage Plans; Continued Interim Plans As part of overall renovation, larger, deeper intercepting sewers and relief sewers were proposed to Oakwood District to alleviate the surcharging and flooding of basement. Contact PCS-79 (2011) implemented sewer modifications designed in the Oakwood Heights area as well as Junction Chamber No. 1 at the headworks (influent channels) to the new Oakwood pump station/CSO RTB just east of Pleasant Ave; PCS-80 (2012) implemented select designed relief and replacement sewers in tributary area to the existing 9'-0"- Liddesdale intercepting sewer. In addition, the proposed system also consisted of a replacement of the existing sewer systems through the district area. The existing sewer system generally consists of sewer line located behind homes, which is connecting sanitary flows from homes and storm flows from the catch basins located in the street.

Previously, GLWA authorized a new task to Applied Science, Inc. (ASI) under CS-1482 to perform the baseline hydraulic and hydrologic analysis for the impacted areas of the Oakwood District based on the recent condition of the site, such as conversion of the green space by the Marathon Oil Company, current hydrologic factors given the current land use, and assessment of other land and abandoned properties.

Moreover, extended efforts have been undertaken by ASI, as engineering representative of Wayne County, and GLWA to address wet weather capacity needs for the intercommunity districts tributary to GLWA's NWI and the county's

	Rouge Valley Interceptor (1965) illustrated on above map)--which are hydraulically-connected with a passive structure (B-097) built in the 1960's at their crossing (i.e., double 6'-6" siphons of the RVI beneath the NWI's alignment) in proximity of Pleasant Ave and Oakwood Ave intersection.
Preliminary Scope of Work	In general, the scope of work for this project involves the study, design and construction of relief sewer, catch basins, and limited improvements to the street, etc. The preliminary scope of this project includes, but is not necessarily limited, to: a) provide basis of design (study) report on alternative solutions to proposed Oakwood District Relief Sewer and intercommunity collection sewer needs with collaborative involvement and outreach with DWSD, Wayne County and impacted intercommunity customers, City of Detroit Planning, Building and Safety Environmental and Engineering, and Park and Recreation Departments, and other stakeholders, b) provide designs (bidding documents) for additional replacement of sewer lines, catch basins, diversion/separation of storm water runoff flows and sanitary-only flows handled within the District proper; potential diversion of proportionate wet weather flows from either, or both, the NWI and RVI in proximity of Pleasant or elsewhere, if more practicable, tributary to the Oakwood Pump Station and Retention Treatment Basin to otherwise provide equalization storage and treated discharge to better serve customers at large and maximize utility of the wastewater system; c) provide bidding and construction oversight (assistance) during initial phase of emerging constriction projects, and d) advertise, bid, evaluate, award and otherwise manage the initial phase of these construction projects. A portion of this work will be deferred until the completion of the wastewater master plan. This CIP-1286 budget includes design and construction budget for 13 ft diameter second influent sewer/tunnel and 440 ft in length from intersection of Liddesdale and Pleasant St interconnecting with existing sewers through a new junction chamber up to Oakwood PS. This second relief sewer is recommended by study under As Needed Engineering Services Contract CS-1482, Task-I (Recommendation Project - 4) by Applied Science completed on 02/26/2016. The proposed project scope will include validation of study, design, construction assistance and construction. This project will be on hold until the completion of wastewater master plan recommendation.
Related projects currently underway or planned	CS-1482, Oakwood District Analysis (ongoing) ; CS-1522 (DWSD), Green Infrastructure; Wastewater Master Plan (under procurement) ; CS-1525, Regulatory Assistance
Potential Challenges	Maintaining the wet weather contract capacities and adequate CSO treatment during extreme storm events and mitigate basement and street flooding in the District and intercommunity regional districts are the most significant challenges that project is intended to responsibly address.
Other – important project information, photos, etc. not fitting in other	Refer to linked aerial photo of Oakwood District with overlay of proposed new sewers, as built drawings of recent construction in the District for PCS-79, PCS-80 and PC-755; map of Intercommunity Collection System including portion of Oakwood District shown above—and other select resources linked below.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

NPDES Permit ,

Aerial Photo of Oakwood Sewer District-- Proposed Sewer Modifications (some completed) & overlay of New Pump Station & CSO Facility

Section Map 72E--illustration of Influent and Effluent Flows to-from Oakwood PS & RTB

Map of Intercommunity Collection System--Wayne County RVI & Other Connections to Northwest Interceptor

PCS-79 Oakwood District Relief Sewer System (Contract 1), PCS-80 Oakwood Relief Sewer System (Contract 2)

CS-1364--Oakwood Basis of Design Report and Design Memorandums

PC-755 Conformed Drawings Book 9, PC-755 Conformed Drawings Book 10

Oakwood Project Performance Certification-Evaluation Report, with transmittal to MDEQ 10.23.13

Oakwood's Operation and Maintenance Overview Manual

Stormwater Management Program Plan--2015 Progress Report

Consolidated Annual Report 2015

GLWA Lease Agreement,

3. PROJECT DRIVER

Primary criteria driving project	2 - Performance (Service Level/Reliability)
Explanation	Preferred alternative wet weather relief sewer modifications to mitigate historical basement and street flooding in impacted districts and otherwise provide increased flow transport and treatment for economic, ecologic and societal benefit of customers in Oakwood District and of effected intercommunity regional customers

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/1/2016 **Prepared By** Gary Stoll **Division** Wastewater Design

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study/Design/Const. Assist.	Not yet started	$0	$0	$550	$350	$200	$100	$0	$1,200	4 Year
Construction	Not yet started	$0	$0	$0	$2400	$5300	$2100	$0	$9,800	3 Year
Year Totals		$ 0	$ 0	$ 550	$2,750	$5,500	$2,200	$ 0	**$11,000**	4 Year

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Phase Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative to Intercommunity Relief Sewer Modifications in Detroit Oakwood District is sewer separation to alleviate flooding, which will be more expensive alternative.
Description of Alternative Evaluation	Separate storm water system will divert the storm water from the existing combined system to the receiving waters without treatment.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Although the District's sewer infrastructure has been partially capitally renewed with previously envisioned relief sewer improvements (PCS-79 and 80)- -including the significant investment made in construction of the Oakwood Pump Station and CSO Retention Basin, the tributary district has undergone and continues to undergo significant demographic changes in recent years, due to blight, abandoned houses and purchase of the vacated land-some repurposed by the City and Marathon Oil for open green space and storm water retention
2) Performance (Service Level / Reliability)	4	Proposed sewer and infrastructure modifications will enhance collection system performance to mitigate historical basement and street flooding in impacted districts and otherwise provide increased flow transport and treatment during extreme wet weather events and otherwise utilize best practices for passive systems for storm water management
3) Regulatory (Environmental / Legal)	5	Potential continued NPDES permit violations—particularly resulting from prolonged (intermittent) discharges from prohibited emergency relief Outfall 054 (B-050) would cause adverse water quality and expose GLWA to costly litigation for repetitive damages if not corrected.
4) O&M	4	Given the foregoing demographic changed circumstances, the development and evaluation of alternative drainage and relief sewer modifications for impacted areas of the Oakwood District from the formerly proposed relief sewer modifications would substantially reduce the construction and O&M cost as reflected on the attached costing summary.
5) Public Health & Safety	3	NPDES permit violations—particularly form prolonged (intermittent) discharges from prohibited emergency relief outfall Outfall 054 (B-050) would cause water quality impacts.

Criteria	Project Manager Score (0-5)	Details
6) Public Benefit	3	Public will benefit from improved water quality in local receiving water bodies.
7) Financial	4	Developing and evaluating alternatives to the proposed Oakwood District Relief Sewer would be less costly and more efficient. Timely completion of this project will benefit department for future plan and inclusion of Oakwood SWMM5 model in updated regional hydraulic Model.
8) Efficiency	4	This project includes an alternative flow routing means that diverts more wet weather flow to the Oakwood Pump Station and CSO facility when wet weather hydraulic conditions warrant, maximizing its use and thereby reducing the peak wet weather flow currently partially transported to the WWTP, thus reducing net operational costs.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	1	2.40	New asset
2) Performance (Service Level / Reliability) 15%	4	4	12.00	Flooding issues
3) Regulatory (Environmental / Legal) 18%	5	2	7.20	Low risk of causing permit violations
4) O&M 11%	4	1	2.20	Not much impact
5) Public Health & Safety 17%	3	3	10.20	Reduce flooding
6) Public Benefit 8%	3	4	6.40	Strategic plan
7) Financial 10%	4	3	6.00	Moderate financial consequence if cancelled
8) Efficiency 9%	4	3	5.40	Right-sizing
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**51.80**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 222001

CIP #: 1286

Project Title: **Intercommunity Relief Sewer Modifications in Detroit's Oakwood District**

Contract Number:

Description: Address Hydraulic Transport Deficiencies and address wet weather relief sewer modications to mitigate basements and streets flooding.

Lead Division:

Division Leader:

Project Manager: Beena Chackunkal

Phone: 313 297 9825

Department Charged: Water / Sewage / Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 11,000

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	-	8	39	79	32	-	158
601997	Capital Allocation: Fringe Benefits	40%	-				-	3	16	32	13	-	63
601998	Capital Allocation: Nonpersonnel	5%	-				-	0	2	4	2	-	8
616900	Construction		-				-	-	2,393	5,185	2,054.20	-	9,632
617950	Contractual Engineering Service		-				-	539	300	200	100	-	1,139
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	-	550	2,750	5,500	2,200	-	11,000

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-												-
Sewer Construction Bonds	-			-	-	-	550	2,750	5,500	2,200	-	11,000	
Sewer I&E	-												-
Project Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 550	$ 2,750	$ 5,500	$ 2,200	$ -	$ 11,000	

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$0	$550	$2,750	$5,500	$2,200	$0	$11,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes / 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**Pump Station No. 2 Improvements (CIP-1287)**
Project Significance	This project will improve the pump reliability of PS-2 to meet the NPDES permit flow capacity requirements.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/29/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Beena Chackunkal	Engineer	WDG
	Beena.Chackunkal@glwater.org		(313) 297-9825
CMG Rep	Monica Y Daniels	Manager	Finance
	Monica Daniels		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Alfredo Lava	Engineer	WDG	(313) 297-5940	Alfredo.Lava@glwater.org

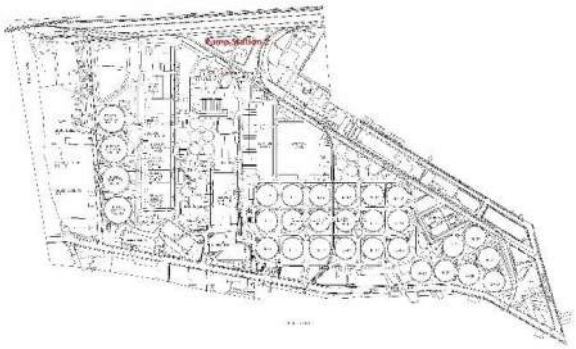
Site Name	Pump Station 2
If Facility, Facility Address	WWTP 9300 West Jefferson
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction Assistance
Primary Focus	WWTP Raw Water Pumping Station No. 2
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Main Raw Sewage Pumps at Pump Station 2



WWTP Pump Station 2 Map

Problem Statement

The Detroit Wastewater Treatment Plant (DWWTP) consists of two pumping stations, namely Pump Station No. 1 (PS-1) and Pump Station No. 2 (PS-2). Pump Station No. 2 has eight raw sewage pumps in service since 1994. The rated capacity of existing pumps is 20-30% less than the design capacity due to wear and drifting as gradual decline in pumping capacity continues. In 2003, the testing of the pumps was performed using a "Wet Weather Protocol" in an effort to increase pumping capacity by modifying variable frequency of the five (5) pumps (i.e. 9, 12, 13, 15 & 16) and rebuilding of the two Pumps (i.e. 11 and 14) because Pump No. 10 was added several years after the original seven were placed in operation. With the gradual decline in pumping capacity, meeting the NPDES wet weather permit has become challenge for Pump Station No. 2. This leaves little to no margin for unexpected pump outages.

Proposed rehabilitation of Pump No. 11 and 14 under PC-795 leaves the remaining six (6) pumps to be reevaluated and rehabilitated through this project. The project should include the rehabilitation of the raw sewage pumps, motors (those were not scheduled to replace under PC-795), replacement of the VFD, motors and repair the architectural damages and cracks, etc.

History / Background

Pump Station No. 2 was built in 1994. Seven out of eight pumps were running since 1994. These pumps never attained the design capacity due to an unidentified

	drifting problem. The eighth pump (Pump No. 10) was installed under PC-740 with a modified suction elbow that provided better pumping capacity. The VFDs for five (5) pumps were also replaced in 2005 under PC-744 contract. A new impeller was installed on Pump No. 9 and a rebuilt impeller was installed on Pump No. 16 in 2008, which provided sufficient improvements in pumping capacity. To mitigate the declining of pumping capacity, DWSD initiated a CS-1444/PC-795 PS-2 Pumping Improvements project to rehabilitate Pump No. 11 and Pump No. 14 to solidify the long-term wet weather capacity of 1700 MGD. It was also recommended to rehabilitate the remaining pumps with energy efficient, and more reliable control systems that require less maintenance, soon.
Preliminary Scope of Work	The preliminary scope of this project is to provide basis of design (study) report for rehabilitation/rebuilding plan for existing pump and its control and any associated equipment. Also included in the evaluation and recommendation is addition of VFD to three constant speed pumps. The study will not be limited to increasing the capacity of existing pumps to meet the long-term goal for wet weather capacity. Provide engineering design for rehabilitation/rebuilding of the pumps, replacement of HVAC System, I&C Improvements (i.e. automation, etc.), structural, architectural and electrical improvement. Also, provide design for any recommendation made by the study report. The services during construction is provide construction assistance, such as review of shop drawings, response to RFIs, attending progress meetings, verifying and assisting DWSD for any changes requested by the contractor, etc.
Related projects currently underway or planned	The work shall start in accordance with the completion of PC-795, PS-2 Pumping Improvements and CS-1481 Rehabilitation of Pump Station No. 2 Rack and Grit Improvements.
Potential Challenges	Shutdowns of the pumps to be rehabilitated will require co-ordination with operations and careful planning to meet NPDES permit requirements for the flow capacity during the construction phase.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project 2 - Performance (Service Level/Reliability)

Explanation	The advantage of rehabilitating Pump Station No. 2 is to increase the long-term rated capacity, operational efficiency, and reliability of the pumping system. Replacement of the existing VFDs and adding new VFDs to constant speed pumps would also provide energy savings and reliable flow control to the Pump Station No. 2; hence, meeting the long-term goal of NPDES permit requirements.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Preliminary Design Estimate

Date of Cost Estimate 7/1/2016 **Prepared By** Alfredo Lava **Division** WDG

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study/Design/Const. Assist.	In Proposed CIP	$0	$600	$300	$300	$200	$0	$0	$1,400	4 Year
Construction	In Proposed CIP	$0	$0	$1400	$4500	$3500	$0	$0	$9,400	3 Year
Year Totals		$ 0	$ 600	$1,700	$4,800	$3,700	$ 0	$ 0	**$10,800**	4 Year

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative to rehabilitating PS-2 would be to build a new PS.
Description of Alternative Evaluation	Build a new PS at the WWTP
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Equipment has been in service for over 20 years.
2) Performance (Service Level / Reliability)	4	Significant reduction in performance.
3) Regulatory (Environmental / Legal)	4	Need to meet required permit flows.
4) O&M	4	Excessive O&M required if not fixed.
5) Public Health & Safety	3	Maintain water quality.
6) Public Benefit	3	Maintain water quality.
7) Financial	4	Save on excessive O&M and potential fines.
8) Efficiency	4	The PS 2 operation will be much more efficient.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	4	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	3	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	4	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

New CIP 211005

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1287

Project Title: **Pump Station No. 2 Improvements at WTTP** **Contract Number:**

Description: Study, design and implement improvements to the 8 pumps, motors, controls and anciliary equipment within Pump Station #2 to increase capacity to meet NPDES requirements

Lead Division: Division Leader:

Project Manager: Beena Chackunkal Phone: 313 297 9825 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 10,800 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs $(000)

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -		22	61	47	-	-	130
601997	Capital Allocation: Fringe Benefits	40%	-					9	25	19	-	-	52
601998	Capital Allocation: Nonpersonnel	5%	-				-	1	3	2	-	-	7
616900	Construction		-				-	1,368	4,411	3,432	-	-	9,211
617950	Contractual Engineering Service		-				600	300	300	200	-	-	1,401
	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	600	1,700	4,800	3,700	-	-	10,800

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-			-	-	600	1,700	4,800	3,700	-	-	10,800
Sewer I&E		-											-
Project Total		$ -	$ -	$ -	$ -	$ -	$ 600	$ 1,700	$ 4,800	$ 3,700	$ -	$ -	$ 10,800

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18		FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$0	$600		$1,700	$4,800	$3,700	$0	$0	$10,800

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title

PC-797 Rouge River Outfall Disinfection and CS-1781 Oversight Consulting Services Contract (CIP#1302)

Project Significance

This project will provide chlorination & de-chlorination to the Rouge River Outfall (RRO) effluent during wet weather events. All the final effluent from Water Resource Recovery Facility (WRRF) through Detroit River Outfall (DRO) and RRO will be chlorinated and de-chlorinated by April 2019 per GLWA's permit requirement with MDEQ.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **4/13/2017** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater Design
	tarlochan.bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Gary Stoll	Engineer	Wastewater Design	(313) 297-6402	gary.stoll@glwater.org

Site Name	GLWA WRRF (formally DWSD WWTP)
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Rouge River Outfall Effluent Flow Disinfection
Previous Project Status	Active
Current CIP Project Status	Active

2. PROJECT INFORMATION

Project Photo & Map

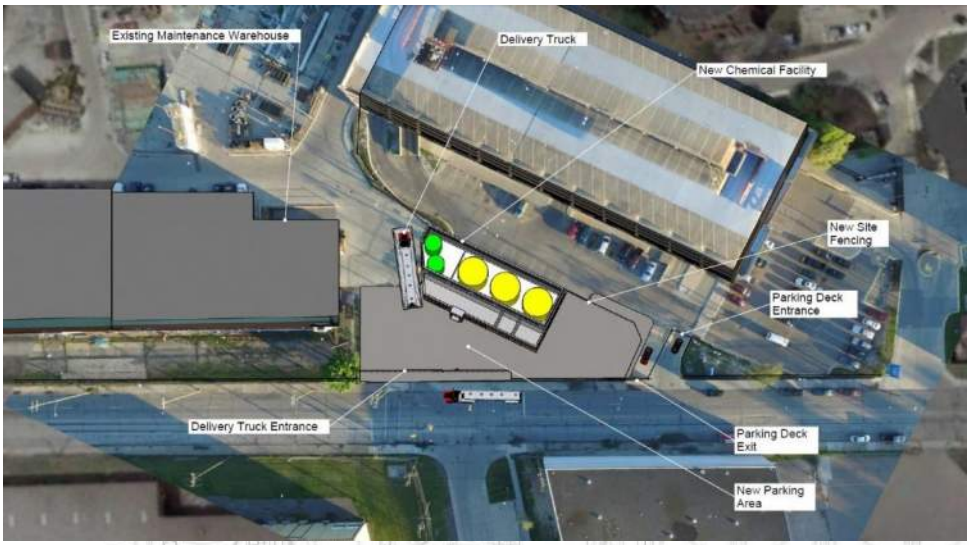
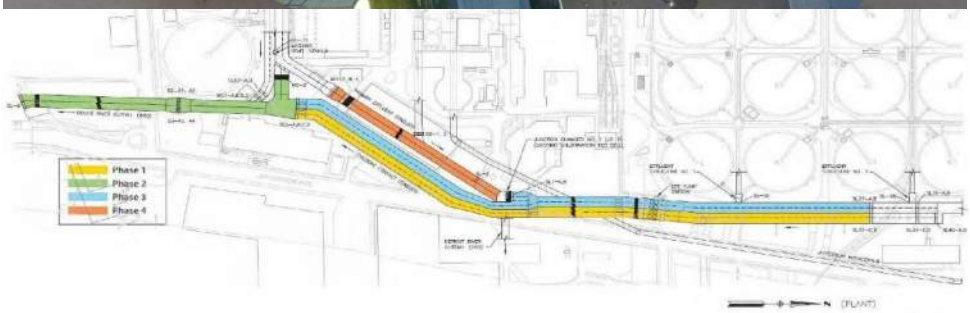


Photo Caption
Proposed new RRO Chemical Building for Sodium Hypochlorite and Sodium Bisulfite Feed.



Location map of PC-797 Rouge River Outfall Disinfection Project Area at WRRF

	During wet weather events, flows at the Detroit WRRF can exceed the 930 MGD secondary treatment capacity. At such times, the WRRF will treat excess wet weather flows through primary treatment and then discharge the Primary Effluent (PE) to enter the Detroit River Outfall (DRO) or to the Rouge River Outfall (RRO). Only the DRO has disinfection, and there have been plans to provide disinfection for the RRO since 2009. This project will provide chlorination and de-chlorination of effluent to the RRO during wet weather events. GLWA and MDEQ have agreed to the schedule to complete the construction by April 2019.
Problem Statement	The Progressive Design Build Contract RRO Disinfection, PC-797 Phase- 1 and Oversight Consulting Services Contract CS-1781 at the Water Resources Recovery Facility (WRRF) are currently ongoing. The CIP#1302 is currently budgeted for $35.20M. The CIP#1302 budget breakdown include progressive design build contracts PC-797, Phase-1 ($2.69), PC-797, Phase-1 Change Order # 1 ($2.84M) and Phase 2 with CDM Contractors Inc. (CCI) ($38.92M) and Oversight Consulting Services Contract CS-1781 ($2.42M) with PMA Consultants. The PC-797 Phase 2 was recently negotiated for final Guaranteed Maximum Price (GMP) for $38.92M on March 20, 2017. The factors which resulted in project capital cost increase are discussed in detail in Section 5 - Alternative Evaluations of this

Business Case Evaluation.
The detailed breakdown of CIP#1302 budget $46.87M for contracts PC-797 Phase-1, PMA Oversight Consulting Services Contract CS-1781, PC-797 Change Order #1 and PC-797 Phase-2 Construction includes:

(A)	CDM Contractors Inc. (CCI) Contract PC-797 Phase- 1	A = $ 2.69M
(B)	PMA Oversight Consulting Services Contract CS-1781	B = $ 2.42M
(C)	CCI Contract PC-797 Phase-1, Change Order # 1	C = $ 2.84M
(D)	Final Negotiated GMP with CCI (03/20/2017)	D = $38.92M
(E)	Final CIP Budget, (03/20/2017), CIP#1302 (A+B+C+D)	E = $46.87M*
(F)	Original CIP # 1302 Budget	F = $35.20M
(G)	Capital Cost Increase from Original CIP Budget (E-F)	G = $11.67M

*This CIP Budget estimate for contract PC-797 with CCI is based on the final negotiated GMP.

History / Background

The DR0-2 Outfall was originally designed in 1998 under CS-1150, and construction began in 1999 under PC-709. Some surface construction work and substantial underground work were performed, including construction of the entrance shaft, two access shafts, six diffuser riser shafts in the Detroit River, and about half of the length of the tunnel. On April 23, 2003, uncontrollable high rates of ground water mixed with Hydrogen Sulfide (H_2S) inflow flooded the tunnel, and it has remained so since that time.

After the tunnel flooded, GLWA (then DWSD) terminated the PC-709 contract and looked for other alternative to complete the work. After further study of the tunnel construction a different alternative was considered and thus, scope for the Modified Detroit River Outfall No. 2 (MOD DR0-2) under CS-1448 design was established. This contract called for a design to construct a new rock tunnel at a higher elevation with Slurry Shield Tunnel Boring Machine (TBM). The design of the MOD DR0-2 was completed on December 2007 and the construction of the DR0-2 project under PC-771 was started on November 2008. Due to economic hardship during the fiscal year 2008/2009, DWSD requested MDEQ to terminate this contract. After further discussion an agreement reached with GLWA (then DWSD) and MDEQ to allow termination of this Contract and look for feasible and cost effective solutions to meet the wet-weather discharge to Rouge River Outfall. Therefore, on April 2009, GLWA (then DWSD) terminated the PC-771, MOD DR0-2 Contract.

The Rouge River Outfall No. 2 (RR0-2) proposal was first developed in 2009. The RR0-2 was to be a ground level conduit extending approximately 2,500 feet to the intersection of the Rouge River and the Rouge Shipping canal. The RR0-2 conduit was to be used during the wet-weather events and primary effluent to the river shall be disinfected by mixing of Chlorine and De-chlorination. The Basis of Design (BOD) for the RR0-2 project was issued on November 6, 2009. GLWA (then DWSD) performed a RR0-2 Segment- 1 contract to do the ancillary work such as modification of gates, stop logs and chlorine tank shut off valves at WRRF.

In 2012/2013 the WRRF commissioned a study of the feasibility of alternative disinfection methods for meeting the requirements of the Rouge River

	Disinfection. The results of this study and a subsequent hydraulic study came to the conclusion that the existing conduits to the Rouge River had sufficient contact time to properly disinfect and dechlorinate the secondary effluent from the WRRF. If a method could be designed to shunt secondary flows to the Rouge River during wet weather and send primary effluent through the longer DRO, then a substantial savings would result from a new design approach. This approach was further explored and discussed with the MDEQ. The result is a NPDES permit modification allowing for the construction of the proposed Rouge River Outfall Disinfection project, keeping the April 2019 project completion date that had been in the NPDES permit.
Preliminary Scope of Work	The main elements of Work to be undertaken for this project under progressive design build contract consist of the following, but are not limited to: (a) Phase-1, Basis of Design and 60% Design Completion: Perform inspection work, develop the Basis of Design and preliminary cost estimate for modified gate structures, chlorination and de-chlorination points, and any structural work needed. Prepare bid packages based on 60% design documents for this progressive design-build project to provide final Guaranteed Maximum Price (GMP) to GLWA. Develop schedule and sequencing to ensure operability of the WRRF during construction. (b) Phase -2, 100 % Design Completion, Construction and Startup: Prepare permit applications and detailed design for gates, connections to the existing outfall conduit, chlorination and de-chlorination equipment. Prepare installation/construction drawings and specifications. Complete the construction work according to the NPDES mandated schedule. Complete construction work in timely manner while interfacing with designer and WRRF to ensure continued WRRF operation. Prepare as-built drawings and O&M manuals, start-up/testing /training, correspondence and negotiation with permitting authorities.
Related projects currently underway or planned	1. CS-1448, RR0-2 Segment 1-WRRF Modifications. 2. PC-786, RR0-2 Segment 1-WRRF Modifications.
Potential Challenges	GLWA and MDEQ have agreed to complete the construction of RRO Disinfection Project by April 2019 to meet NPDES permit requirements. The construction completion schedule by April 2019 to meet the permit requirement will be challenge.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	3 - Regulatory (Environmental/Legal)
Explanation	GLWA's WRRF to be in compliance with its NPDES permit must provide disinfection to all effluent flows from DRO and RRO by April 2019. Presently only DRO has disinfection, and there have been plans to provide disinfection for the RRO since 2009. This project will provide chlorination and de-chlorination of effluent to the RRO during wet weather events. GLWA and MDEQ have agreed to the schedule to complete construction of RRO Disinfection Project by April 2019.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source 60% Design Documents

Date of Cost Estimate 4/12/2017 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Lifetime Thru FY 2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study & Design, CCI Contract PC-797 Phase 1	Under Procure-ment	$729	$2690	$0	$0	$0	$0	$0	$0	$2,690	1 Years
Oversight Consulting Services PMA Contract CS -1781	Under Procure-ment	$0	$1000	$800	$520	$100	$0	$0	$0	$2,420	4 Years
Construction CCI Contract PC-797 Phase 1 (CO#1) & Phase 2 (Final Negotiated GMP)	Not Yet Started	$0	$2840	$15000	$15000	$8920	$0	$0	$0	$41760	3 Years
Year Totals			$6530	$15,800	$15,520	$9,020	$ 0	$ 0	$ 0	**$46,870**	4 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Alternative A – Use existing GLWA Chlor-Dechlor facility with Cl2 gas for disinfection and SO2 gas for de-chlorination for DRO effluent flow, Build a New Chemical Building and use liquid sodium hypochlorite for disinfection and sodium bisulfite for de-chlorination for RRO effluent flows.
Description of Alternative Evaluation	The total Capital Cost for PC-797, Alternative A based on the final negotiated GMP with CCI (03/20/2017) is $44.45M. The capital cost of using the existing GLWA Chlor-Dechlor facility with gaseous system for DRO effluent flow and building a new chemical building with liquid system for RRO effluent flow is $8.80M more than $38.07M using the existing Chlor-Dechlor gaseous system for both RRO and DRO effluent flows. The proposed new liquid system is safe and less risky, so GLWA Management made a very strategic decision to select Alternative A over Alternative B, even though it was capital cost intensive. During the RRO Disinfection Project PC-797, Phase – 1, CDM Constructors Inc. (CCI) performed Disinfection and De-chlorination Alternative Cost Analysis. In this analysis 10 alternatives were developed, which included 6 for disinfection and 4 for de-chlorination. Please note that this capital cost analysis by CCI during the study phase was for disinfection and de-chlorination only, additional cost was identified during the 60% Design for the above selected Alternative A. For additional detailed information please refer to CDM Smith Detailed Engineering Report, Permitting Plan, 15% Project Schematics submitted to GLWA and MDEQ on May 31, 2016. The capital cost for all the alternatives is: Alternative 1 (Alternative-B in BCE) - Cl2 gas system for both Secondary Effluent (SE) and Primary Effluent (PE) use existing Chlor-Dechlor facility Capital Cost $12.05M. Alternative 2 (selected Alternative-A in BCE) – use existing Cl2 gas system for SE and build new chemical building with sodium hypochlorite liquid system for disinfection for PE Capital Cost $24.9M. Alternative 3 – use all liquid system sodium hypochlorite disinfection, 2 new separate facilities for PE and SE Capital Cost $34.10M. Alternative 4 - use all liquid system sodium hypochlorite disinfection new single facility for PE and SE Capital Cost $30.37M. Alternative 5 - use UV disinfection for SE and liquid system sodium hypochlorite disinfection for PE Capital Cost $128.51M. Alternative 6 - use UV disinfection for SE and use existing CL2 gas system for PE Capital Cost $115.66M. Alternative 7 (selected Alternative-A in BCE) - use liquid system Sodium Bisulfite (SBS) for RRO Capital Cost $8.90M. Alternative 8 (Alternative-B in BCE) - use existing gaseous SO2 system for RRO Capital Cost $6.88M, Alternative 9 - use liquid SBS system for both RRO and DRO Capital Cost $15.39M. Alternative 10 - use liquid SBS system for RRO and use existing gaseous SO2 system for DRO Capital Cost $6.88M.

Alternative (Pick)	Alternative B – Use existing GLWA Chlor-Dechlor facility with Cl2 gas for disinfection and SO2 gas for both DRO and RRO effluent flow.
Description of Alternative Evaluation	The total Capital Cost for Alternative B is $38.07M. The capital cost of using the existing GLWA Chlor-Dechlor facility is $8.80M less than building a new chemical building for RRO disinfection under the selected Alternative A.

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	3	The existing RRO concrete conduits are 40 years and will require rehabilitation.
2) Performance (Service Level / Reliability)	4	Equipment will be new and it will be easy to maintain in near future.
3) Regulatory (Environmental / Legal)	5	GLWA to be in compliance with its NPDES permit must provide disinfection to RRO effluent flow by April 2019.
4) O&M	4	Significant O&M cost will be required to operate RRO effluent flow disinfection.
5) Public Health & Safety	5	Permit violations would cause water quality impacts.
6) Public Benefit	3	Public will benefit from improved water quality.
7) Financial	5	Exposure to multiple fines for permit violations
8) Efficiency	3	Project will have a no to moderate impact on efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	3	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	5	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	5	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	5	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	3	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	4/12/2017	Document updated
Hannah Slabaugh	4/27/2017	Format updated, phase statuses updated per master spreadsheet "Lifetime thru FY2016" column added to Capital Cost Estimate.

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Director	Digital signature Dan Alford	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA uthority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 212006

CIP #: 1302

Project Title: **River Rouge Outfall Disinfection** **Contract Number:**

Description: Ensure wet weather sewerage flows are treated before release into Rouge or Detroit Rivers

Lead Division: Division Leader:

Project Manager: Beena Chackunkal Phone: 313 297 9825 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** X Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 40,340 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	338	332	193	-	-	-	862
601997	Capital Allocation: Fringe Benefits	40%	-				135	133	77	-	-	-	345
601998	Capital Allocation: Nonpersonnel	5%	-				17	17	10	-	-	-	43
616900	Construction		-			6,030	14,510	14,539	8,641	-	-	-	43,720
617950	Contractual Engineering Service		-		729	500	800	500	100	-	-	-	2,629
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ 729	$ 6,530	15,800	15,520	9,020	-	-	-	47,599
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		729	6,530	15,800	15,520	9,020	-	-	-	47,599
Sewer I&E			-										-
	Project Total		$ -	$ -	$ 729	$ 6,530	$ 15,800	$ 15,520	$ 9,020	$ -	$ -	$ -	$ 47,599

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17 and Prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS			$0	$0	$0	$0	$0	$0
SDS	$7,259	$15,800	$15,520	$9,020	$0	$0	$0	$47,599

SPENT $1185k before 2017 FY budget

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

New CIP 213006

CIP 1309

DETROIT WATER & SEWERAGE DEPARTMENT

CAPITAL IMPROVEMENT PROGRAM

PROJECT PROPOSAL

Project Title: **Improvement to Sludge Feed Pumps at Dewatering Facilities**

CIP: Sewerage CIP 1309

1. Problem Statement

The Detroit Water and Sewerage Department dedicated the Sludge Feed Pumps SFP-3 & 4 to handle the portion of the liquid sludge from the Wastewater Treatment Plant to new Biosolids Dryer Facility (BDF) across Jefferson. The original sludge feed pumps were WEMCO recessed impeller type and were required continues maintenance due to the buildup of rags into systems causing pump failure. The existing recessed impeller pumps (Wemco and Gould) were also found to be insufficient for the current application and also completing its life cycle. Several years ago, the department wanted to pilot test the centrifugal pump with chopper capability. It was decided to replace SFP-1 and SFP-3 with Vaughn chopper pumps.

Unlike the recessed impeller pumps, a centrifugal chopper pump was installed first time for this application. No detailed references were available for this kind of pump and therefore, a pilot was set up to test the pump. It is noted that the existing recessed pumps were also not performing efficiently per the operational demand.

After installation of SFP-1, WWTP Operations has found out that the new pump is not meeting the rigorous requirements of their operations and requires frequent maintenance. After several meetings between plant operations, engineering, contractor, and vendor, it was decided to modify the pump impeller from the galvanized steel to high speed chromium material to withstand the high grit into the systems. The modification has recently completed and Pumps is in operations. However, it has not been tested for a while, but it is presumed that the various solid concentrations flows at the plant may require either recirculation pumping system (as added for BDF) or addition of the smaller pumps.

2. History (Background)

Wastewater Treatment Plant (WWTP) has six (6) Sludge Storage Tanks (SST-1, 2, 3, 4, 5 &6), which feed sludge to the dewatering facilities (i.e. belt filter presses complexes and complex II centrifuges.) Typically, sludge from Storage Tanks 1 & 2 supplies the centrifuges on dewatering complex II upper level; sludge from Storage Tanks 3 & 4 supplies the centrifuges on the lower level of Dewatering Complex II; and sludge from Storage Tanks 5 & 6 supplies the belt filter presses in Dewatering Complex I. However,

control valves in the Dewatering Complex II basement allow sludge from any storage tanks to supply any Dewatering area.

DWSD Contract PC-792, Biosolids Dryer Facility (BDF), Storage Tanks SST-3 & 4 along with Sludge Feed Pumps SFP-3 & 4 proposed to be dedicated to BDF Facility. Recently, DWSD collected above pumping data from the pumping curve provided by the centrifugal pump manufacturer and discussed with operations for the flow requirements. The plant operations indicated that if only two belt filter presses are available, the flow requirement would be 500 GPM and existing as well as new Vaughn Chopper Pump cannot deliver the flow efficiently and flow will drop if the solid concentration increases to 10%. Furthermore, if the solid concentration increases, the pumping capacity decreases. However, controlling the low flow efficiently is a key factor in the operations. The solids concentration of sludge was specified in 2.5-6% under the small capital pilot project and PC-792 contract. However, plant operations have suggested that the solid concentration is in the range of 2.5-10%. It is to be noted that higher solid concentration causes reduction to the Pump's RPM, which changes the pumping efficiency.

Depending on the large ranges of flow requirements and higher solid concentrations, selection of a pump becomes a challenging task. However, we considered a few options to allow ranges of flow and higher solid concentration, such as the addition of smaller pump for staging the low flow, adding a recirculation system (as shown on the attached drawings), and/or finding a different pump to provide various flows and solid concentration.

3. Potential Alternatives Solutions (Project Objective)

The main objective for this project is to meet the NPDES permit for a long-term solid processing capacity of the WWTP and Bisolids Dryer Facility. To achieve this goal, the evaluation and designing modifications to sludge feed pumps is needed.

The potential alternative solution would be conveying sludge with existing pumps, which may not be capable of pumping the sludge at higher than 6% of solid concentration, which requires constant need of maintenance.

4. Operational Benefits of Proposed Project

With the new proposed centrifugal pumps, which is available with at least five different types of impellers, each of which functions a bit differently. In addition, the chopping

capability to the pump so it may subside the problem of rags and plugging of the pump would help operations to avoid the repeated maintenance for unplugging of the line.

This will allow operations to allocate its maintenance resources somewhere else and keep the overall system in compliance with MDEQ-NPDES permit.

5. Financial Benefits of Project Proposal

The operational flexibility to operate pumps at the solid concentrations of 1 to 10 at any given interval will avoid downtime and avoid the penalty. The capital cost for the addition of the proposed system will be offset by current maintenance downtime and unnecessary permit violation.

6. Preliminary Scope of Work

In general, the scope of work for this project involves the study, design, and construction for the replacement of the pumps and proposed modification of the systems. The consultant will evaluate following two options during the study phase of the project such as:

- Addition of Recirculation Systems: plant can operates BFP from the solid ranges of 1 to 10 at any given interval
- Addition of Smaller Pumps for low flow: sharing load between large and small pumps shall also extend the life cycle for both pumps

Once the above study is completed and recommended options has been selected, the consultant shall provide the design documentation of selected modification. Construction assistant services such as review of shop drawings, responses to RFI, and other miscellaneous work shall be provided.

7. Related Projects Completed, Currently Underway or Planned

PC-787, PC-791, PC-792

8. Time Requirements

The proposed duration for this contract is three (3) years, commencing as soon as contract can be awarded.

Study:	Three (3) Months
Design	Six (6) Months
Construction:	Twenty-Four (24) Months
Total:	Thirty-three (33) Months

9. Capital Cost Estimates

Attached is preliminary cost estimate and present value/life cycle cost analysis worksheet for this project.

CIP FISCAL YEAR EXPENDITURES PROJECTIONS

2016-17	2017-18	2018-19	2019-20	2018-19	Remaining	Total
$50,000	$1,000,0000	$1,500,000	$810,000	$0.0	$0.0	$3,360,000

10. Present Value/ Life Cycle Cost Analysis

Present Value calculated for 20 years Life Cycle for this project: **$3,780,000**
Equivalent Annual Cost of the project: **$303,317**

11. Identification of In-House Responsibility

Construction: Wastewater Construction Group, Wastewater Operations Group

Contact persons:

Parvez Jafri	Head Engineer of Water Systems
Sanjeev Mungarwadi	Manager - Engineering
Majid Khan	Operations Manager, Wastewater Operations

12. Reference Materials:

PC-787 As-Build Documentation
2013 Needs Assessment Study

Submitted by: _____ Date_____
Parvez S. Jafri, P.E.

Recommended by: _____ Date_____
Sanjeev Mungarwadi, P.E.
Manager - Engineering

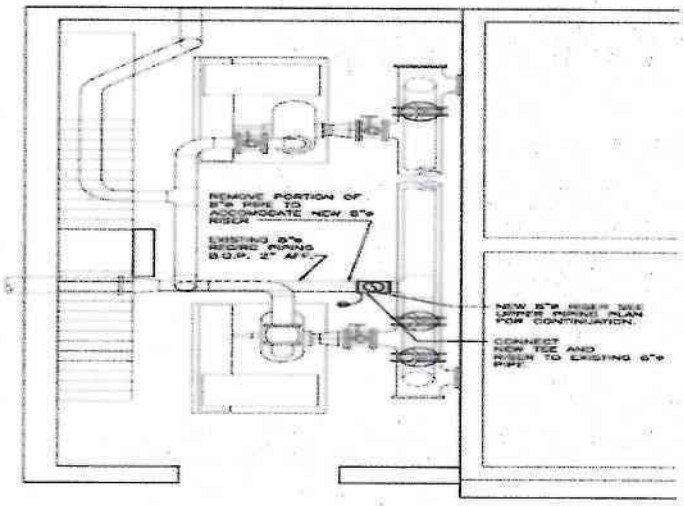
Concurred by: _____ Date_____
Wendy Barrott
General Manager

Concurred by: _____ Date_____
David McNeeley
Interim Director - Wastewater

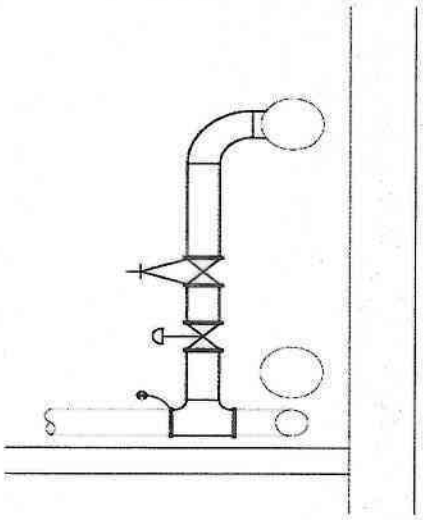
Approved by: _____ Date_____

Cheryl Porter
Chief Operating Officer

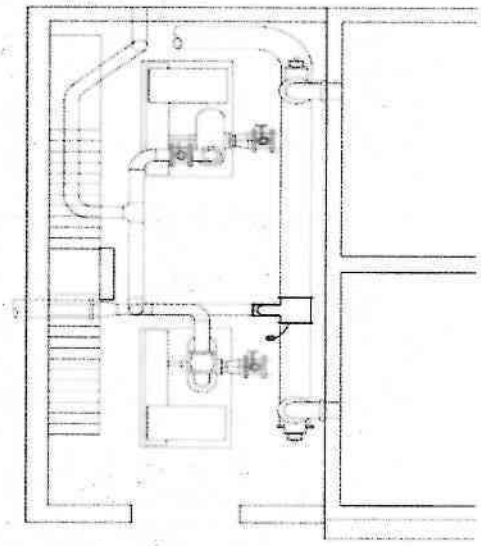
Proposed Recirculation System



RECIRCULATION
PIPING PLAN LOWER
1



RECIRCULATION
SECTION
3



RECIRCULATION
PIPING PLAN UPPER
2

DEFINITIONS:

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

INSTRUCTIONS FOR COMPLETING THE ATTACHED WORKSHEETS

STEP 1: Download The Blank Worksheets From The CMG Web Page

STEP 2: You Must Complete Page 1 before you begin Page 2
REASON: *the values from Page 1 will automatically carry over to Page 2*

STEP 3: Input Information Requested In Blue Colored Cells On Page 1 first, then proceed to the Blue Cells on Page 2
Both pages have built-in formulas to make completing the form quick and easy.

STEP 4: After Populating The Blue Cells With Requested Information, The Forms Are Complete

STEP 4: Save Your Worksheets In Your Own Electronic File Folder For Future Use.

NOTE:

The Preparer should use reasonable, consistent, reliable, and well documented data or assumptions in completing the Present Value/Life Cycle Cost Analysis.

INSTRUCTIONS: Project Manager must input data in the blue cells. The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Capital Cost Estimate Worksheet

Improvement to Sludge Feed Pumps at Dewatering Facilities

	Input Data Into Colored Boxes Alt. "A"	Input Data Into Colored Boxes Alt. "B"	Line Item #
Study Phase			
Consultant Fee	$50,000		
In-house Force Account	$10,000		
Sum Total of Study Phase	**$60,000**	**$0**	**1**
Design Phase			
Consultant Fee	$100,000		
In-house Force Account	$50,000		
Sum Total of Design Phase	**$150,000**	**$0**	**2**
Construction Phase			
Construction Cost			
Civil Items	$500,000		
Mechanical Items	$1,500,000		
Electrical Items	$500,000		
Miscellaneous	$500,000		
Subtotal Sum	$3,000,000	$0	3
Mobilization & Demobilization Costs:	$150,000	$0	4
Subtotal *(Line Items# 3+4)*	$3,150,000	$0	5
G.C./O.H./Profit: *(15% of Line Item# 5)*.....	$472,500	$0	6
Subtotal *(Line Items# 5+6)*	$3,622,500	$0	7
Provisionary/Contingency Allowance:	$362,250	$0	8
Subtotal *(Line Items# 7+8)*	$3,984,750	$0	9
Consultant Fee for Construction Assistance Services	$100,000		10
In-house Force Account for Construction Phase	$50,000		11
(Line Items# 10+11+12).....	**$4,134,750**	**$0**	**12**
(Line Items# 1+2+12) ...	**$4,344,750**	**$0**	13

INSTRUCTIONS: Project Manager must input data in the blue cells. The white cells are automatically calculated.

CIP PROJECT PROPOSAL
Present Value/Life Cycle Cost Analysis Worksheet

Improvement to Sludge Feed Pumps at Dewatering Facilities
0

(Provide information in the blue shaded cells only. All other cells are auto-calculated.)

		Alt. "A"	Alt. "B"	Line Item #
Capital Cost "C"				
Design & Installation Cost for the New Equipment				
Estimated Study Phase Consultant Fee		$50,000	$0	
Estimated Study Phase Force Account Cost		$10,000	$0	
Estimated Design Phase Consultant Fee		$100,000	$0	
Estimated Design Phase Force Account Cost		$50,000	$0	
Estimated Construction Cost (Contractor)		$3,000,000	$0	
Estimated Construction Phase Assistance Consultant Fee		$100,000	$0	
Estimated Construction Phase Assistance Force Account Cost		$50,000	$0	
Sum Total of "Present Value of Capital Cost" Items	C =	**$3,360,000**	**$0**	1

Study, Design, and Construction Period Interest Value "I"

Total Project Period: n_1 = 5 years *(this includes study, design, and construction phases)*

Interest Rate: i = 5.0 % per year

Present Interest Value "I" = ($i*n_1*C)*.5$	I =	**$420,000**	**$0**	2

Annual Operation & Maintenance Cost "A"

Operation Cost		$0		
Maintenance Cost		$0		
Energy Cost		$0		
Sum Total of "Annual O & M Cost" Items	$A_{O\&M}$ =	$0	$0	
Present Value of O & M Cost = $A_{O\&M}*((1+i)^n-1)/(i*(1+i)^n))$	$P_{O\&M}$ =	**$0**	**$0**	3

or P=A(P/A,i%,n_2) **where:** i = 0.05 *and* n_2 = 20 yrs. (See Table below)

NOTE: the useful life (n_2) is as follows:	
n_2	
5	*yrs. for Computers & Systems Equipment*
20	*yrs. for Equipment (non-computer systems)*
40	*yrs. for Structures*
50	*yrs. for Sewers & Water Mains*

Salvage Value "S" *('Assuming Present Salvage Value)*	S =	$0	$0	4
Total Present Value (P) of Project of 20 **Year Life** *= (Line Items#1+2+3+4)*	P =	**$3,780,000**	**$0**	5
Equivalent Annual Cost (A) of the Project = $P*((i*(1+i)^n)/((1+i)^n-1))$ or A = P(A/P,7%,20)	A =	**$303,317**	**$0**	6

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213006

CIP #: 1309

Project Title: **Improvements to Sludge Feed Pumps at Dewatering Facilities** Contract Number:

Description: Due to problems with current pumps, improve sludge feed pumping system for wide operating conditions

Lead Division: Waste Water Engg Division Leader:

Project Manager: Beena Chackunkal Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018 to 2022 $ 1,152 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 5	$ 9	$ -	$ -	$ -	$ -	$ 14
601997	Capital Allocation: Fringe Benefits	40%	-				2	4	-	-	-	-	6
601998	Capital Allocation: Nonpersonnel	5%	-				0	0	-	-	-	-	1
616900	Construction		-				$ 274	$ 691	$ -	$ -	$ -	$ -	965
617950	Contractual Engineering Service		-			$ 33	$ 121	$ 46				$ -	200
Jill: Need GL Code	Materials		-			-	$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-			-							
	Project Total		$ -	$ -	$ -	$ 33	$ 402	$ 750	$ -	$ -	$ -	$ -	$ 1,185
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Water I&E			-										
Sewer Construction Bonds			-		-	33	402	750	-	-	-		1,185
Sewer I&E			-										
	Project Total		$ -	$ -	$ -	$ 33	$ 402	$ 750	$ -	$ -	$ -	$ -	$ 1,185

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$33	$402		$750	$0	$0	$0	$0	$1,185

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] Date:

(circle applicable funding source): **Bond** **I&E** CMG

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA
Great Lakes Water Authority

Project Title	**Construction of the Improved Sludge Conveyance and Lighting System at the WWTP (CIP-1311)**
Project Significance	GLWA have an ongoing study and design of sludge cake conveyance system improvements project after the March 4, 2016 fire incident in Complex –II Incinerators building. The scope of this project requires study and design a cleaner, fire resistant, reliable and safe sludge cake conveyance system. This design upon completion will require a complete new cake conveyance system, repair or replacement in kind to be implemented/constructed in an expedited schedule to the sludge feed system in Complex II Incinerators. Lighting upgrades to both Incinerator Complex II and Dewatering Complex II have been added to the scope to address the need for improved lighting in both of these buildings.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** Needs Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater
	Tarlochan.Bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Alfredo lava	Engineer	Wastewater Design	(313) 297-5940	alfredo.lava@glwater.org

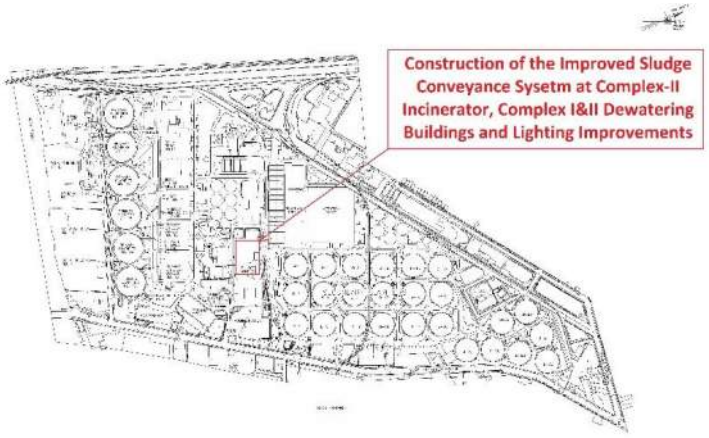
Site Name	GLWA WWTP
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Construction
Primary Focus	Sludge conveyance system in Complex-II Incinerator and Complex I & II Dewatering and Lighting improvements in Complex-II Incinerator & Dewatering Buildings.
Previous Project Status	Active
Current CIP Project Status	Active

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Picture from left to right Sludge Conveyer G Damaged by Fire and Conveyer B in the Complex – II Dewatering Building and Fire Damaged Conveyer H in Complex-II Incinerators Building.



Location Map of Complex – II Incinerators, Complex I & II Dewatering Buildings at the WWTP

Problem Statement	A fire occurred at the Detroit WWTP on March 4, 2016 that severely damaged belt conveyors feeding Incinerators in the Complex II. GLWA immediately initiated study and design for improvements to the sludge conveyance system, which was already on the list of capital improvement planning projects. The intent of this project is to study and design a cleaner, fire resistant, reliable and safe sludge conveyance system. The ultimate goal of this project to have a more reliable sludge conveyance system for better control and operation. This design upon completion will require a completely rehabilitated sludge conveyance system, either repair or replacement in kind to be constructed in an expedited schedule for the Complex II Incinerators. In addition this project will require a comprehensive evaluation, study, design and construction of the Complex-I and Complex-II Dewatering sludge conveyance system integrated with the Complex-II Incinerators feed system. The lighting upgrades to both Incinerator Complex II and Dewatering Complex II have been added to the scope to address the need for improved lighting in both of these buildings.
History / Background	The C-II Incineration complex is over 40 years old. Major rehabilitation had been deferred over the years in anticipation of an alternative boisolids disposal solution to handle all the solids. The Complex-II have many major pieces of equipment that are nearing the end of their useful life and require replacement

	or major rehabilitation in order to be used as the primary long-term solids disposal method. GLWA approved a PC-774 and PC-791 contract to rehabilitate some of the aging problem of the incineration and to meet the new air permit requirements. GLWA just completed the construction of a Biosolids Dryer Facility (BDF) with a firm capacity of 316 dry tons per day. The BDF facility is currently in operation under an in-term agreement with NEFCO. The current GLWA plan for Biosolids disposal is to 1st utilize BDF, additional load to Complex-II Incinerator's and anything beyond the capacity to the land fill as a last option of bio-solids disposal. The current Biosolids Disposal Plan requires investment in the Complex-II Incinerators to process additional sludge loads on regular bases for the daily and wet weather events to avoid the highest cost bio-solids disposal method of land fill. Study, Design and construction for the Replacement of Sludge Conveyance System for Incineration Complex II is required. The sludge from Dewatering Complex II travels through a series of conveyor belts (i.e., conveyors G, H and J) before it reaches Incineration Complex II. The sludge from Dewatering Complex II Lower Level was transported by Conveyor G to Conveyor H. In Incinerator Complex II, Conveyor H branches to Conveyors K and L then continue to various conveyors to feed incinerators. The sludge from Dewatering C-II Upper Level was transported by Conveyor J which branches to Conveyors M and N in Incineration C-II then continue to various Conveyors to feed incinerators. The conveyor belt structures in Incineration C-II are old, have been modified, rebuilt or repaired several times that might have altered the overall integrity of the structures. The existing "Dusseau" hopper oftentimes plugged resulting to sludge spillage. The existing feed system to the incinerator from the hoppers should be redesigned and replaced. New control systems, safeguards, provision of SFE water, run time meter or tie to ovation system and poor lighting system in the complex needs improvement. Drainage problems had historically existed within the basement of Complex II Incineration and C-II Dewatering having to do with both building drainage, and filtrate drainage. These problems led to excessive demands on operations and maintenance staff, shutdown of process-related equipment, and safety concerns for WWTP personnel. Improvements to the C-II Incinerators building drainage system were completed in 2003 under contract DWP-1028. However, the drainage problems were not completely eliminated and still continue to exist and further Improvements to the C-II Dewatering under contract CS-1483/PC-787 and this contract CS-060 for the Complex-II Incinerators Building are in design for improvements. In order to have an effective sludge conveyer's wash system a key requirement for safe operation of sludge conveyance system the drainage improvements in the Complex-II Dewatering and Incinerators building are essential.
Preliminary Scope of Work	The design scope of this project includes restoration of sludge conveying capacity lost due to fire damage and provide improved sludge conveyance from each dewatering facility to improve operations and reduce future risks. To achieve this goal, evaluation study, design and construction is needed. Currently study is ongoing followed by design and construction. The following are the objectives of this project: (a) Provide an a cleaner, fire resistant, reliable and safe sludge

conveyance system from all three dewatering complexes to Complex II incinerators and Central Offload Facility (COF) to eliminate spillage of sludge cake, minimize health and fire hazards resulting from sludge cake spillage and exposure, and reduce or eliminate odors emitted during sludge conveyance. (b) Provide sludge conveyance system with redundancy to allow continued operation of all dewatering units, all Complex II incinerators, and the central offload facility at full capacity despite any single failure. Existing undamaged conveyors may remain in place to provide additional redundancy. (c) Reduce risks associated with conveyor operations. (d) Improve sludge cake feed to incinerators to allow improved incinerator performance. (e) Maximize reliability of WWTP solids processing. (f) Provide safe and effective sludge cake conveyance that will reduce risks associated with conveyor operations. (g) Conveyors shall be designed to operate at full capacity with any sludge cake throughout the historical range of solids percentages produced during the past 10 years. It shall not be necessary to add water or otherwise condition the dewatered cake to achieve the required conveying capacity. (h) Provide capacity and turndown capability that will allow sludge cake conveyance at the rates needed to operate any number of Complex II incinerators from one through all eight, as well as any number of the installed belt filter presses or centrifuges in any combination of one, two or all three dewatering complexes. Provide the capability to operate with as few as one dewatering unit and one incinerator or with all units and incinerators in simultaneous operation at 100% capacity. (i) Provide capability to flush or clean elements of the conveyance system before they are removed from service, or in case of a failure or forced outage of the equipment. (j) Provide capability to readily clean stoppages from conveyance solution. (k) Provide ample size and capacity of equipment to prevent excessive wear and overload under all circumstances. (l) Provide a conveying solution complete in every respect including conveyors, pumps, chutes, plows, drip pans, flushing and cleaning capabilities, support structures, all necessary electrical and controls, safety provisions, walkways and platforms required for access to the conveying solution and to allow convenient access to all portions of the facility otherwise blocked by the conveyor, any necessary lighting, and other appurtenances to provide a complete and reliable solution optimized for operation and maintenance. (m) Equipment shall be constructed of wear resistant and corrosion resistant material suitable for the application. Provide replaceable liners and/or other provisions for easy maintenance and extended life. (n) Comply with GLWA master specifications, Contract PC-791, applicable codes and standards, GLWA permits, and all regulations. 1 - Provide sufficient capacity so that sludge conveyance shall not cause a bottleneck to maximum capacity operation: 2 - Provide conveyance capacity from all three dewatering complexes to all Complex II incinerators at not less than the previously installed capacity. 3 - Conveying capacity shall be sufficient to provide for dewatering and disposal of not less than 850 dtpd of sludge cake having any percentage of solids within the 10-year historical range. 4- Conveying capacity shall be sufficient to transport sludge cake produced by each dewatering complex at 100 % of peak dewatering capacity 5- Conveying capacity shall be sufficient to simultaneously transport sludge cake to operate all of the Complex II incinerators at 100% of their peak capacity. 6-Conveying capacity from each dewatering complex shall support operation of the central offload facility at

	100% of its design capacity. (o) Recommended conveyance solution and incinerator feed improvements shall be approved by the Owner before detailed design begins.
Related projects currently underway or planned	The change order to Contract PC-791 was issued by GLWA to address the fire emergency and restore the operation of C-II Incineration, This project is currently underway and anticipated to be completed by December 2016. This emergency services change order to Walsh Contract PC-791 will restore the operation of Complex-II, interrupted by the fire damage. The current proposed project will continue to improve Complex-II sludge conveyance system reliability and redundancy. The proposed project's objective is achieve a cleaner, fire resistant, reliable, redundant and safe sludge conveyance system operation in the Complex-II Incineration.
Potential Challenges	Maintaining the sludge conveyance capacity to meet permit requirements during the construction of these improvements, will be the most significant challenge on this project.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	3 - Regulatory (Environmental/Legal)
Explanation	The existing sludge conveyance system is very old and is critical to disposal of biosolids to meet permit requirements (e.g. incinerator air permit requirements). The disposal of boisolids to meet allowable permitted inventory of biosolids at the WWTP, sludge conveyance system play's key role in meeting permit requirements.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.
Salvage Value: The estimated value of an asset at the end of its useful life.
Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 4/7/2017 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design & Const. Assistance Contract CS-060	In Proposed CIP	$1500	$500	$0	$0	$0	$0	$0	$2,000	Phase Duration
Construction	In Proposed CIP	$0	$9100	$7822	$0	$0	$0	$0	$16,922	2 Years
Year Totals		$1,500	$9,600	$7,822	$ 0	$ 0	$ 0	$ 0	**$18,922**	2 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Original CIP Budget for this project in FY 2017-2021 was $5.96 M, during the CS-060 BOD phase cost estimate it was identified that the construction budget will fall short from the planned CIP budget. Addition CIP Budget transfer from the existing project is transferred. Additional budget made available from the following existing projects are:

CIP# 291 = $ 4.895 M
CIP# 1194, = $ 3.565 M
CIP# 1100, PC-776 = $ 2.502 M
Total Added = $10.962 M
Existing CIP Budget = $ 5.960 M
Total New CIP Budget = $16.922M

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Alternative to replacement in kind sludge conveyance system improvements in this project is enclosed cake pump sludge conveyance system. The alternative will cost approximately $30 million, with potential of regulatory review to meet much more stringent air quality permit requirements to meet New Source Pollution Standards (NSPS). The current C-II Incinerator were not rehabilitated to meet NSPS rather much less stringent MACT standards. This will require more investment in the C-II Incinerators.
Description of Alternative Evaluation	Instead of open sludge conveyance system using conveyer belts, the alternative will use enclosed system with cake pump and pipe system to feed sludge to the Complex-II Incinerators.
Alternative (Pick)	Alternative Method Type

Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Some components are passed their useful life (i.e 30-40 years)
2) Performance (Service Level / Reliability)	4	Much of the equipment is out frequently out of service.
3) Regulatory (Environmental / Legal)	5	If the sludge conveyance system goes down, there is an immediate risk of non-compliance for air permits and permitted sludge inventory at the WTWP.
4) O&M	4	Significant O&M is required to keep the existing sludge conveyance in service.
5) Public Health & Safety	5	Permit violations would cause air quality.
6) Public Benefit	3	Public will benefit from improved air quality and odor from sludge inventory.
7) Financial	5	Exposure to multiple fines for permit violations
8) Efficiency	4	Project will have a significant impact on efficiency of other equipment by keeping them in service.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	5	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	5	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	5	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	4/13/2017	Document updated

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213007

CIP #: 1311

Project Title: **Modification to Incinerator Sludge Feed Systems at Complex -II**

Contract Number:

Description: Install an effective conveyance system for sludge cake in Incinerator Complex 2. Also, address lighting needs in Incinerator Complex 2 and Dewatering Complex 2

Lead Division:

Division Leader:

Project Manager: Tarlochan Bhullar

Phone: (313) 297-5925

Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 16,922

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	-	-	-	-	-	-	-
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-				9,100	7,822	-	-	-	-	16,922
617950	Contractual Engineering Service		-			1,500	500	-	-	-	-	-	2,000
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 1,500	9,600	7,822	-	-	-	-	18,922
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-	1,500	9,600	7,822	-	-	-	-	18,922
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ 1,500	$ 9,600	$ 7,822	$ -	$ -	$ -	$ -	$ 18,922

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17 and Prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS			$0	$0	$0	$0	$0	$0
SDS	$1,500	$9,600	$7,822	$0	$0	$0	$0	$18,922

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

Project Title	**CIP-1312, Pump Station No 1 Improvements (CS-102)**
Project Significance	The rehabilitation and adequate operation of the Pump Station 1 is vital to maintain NPDES permit compliance.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **4/13/2017**

Project Origin Condition Assessment

Project Manager/Sponsor	Beena Chackunkal	Engineer	Wastewater Design
	Beena.chackunkal@glwater.org		(313) 297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Lava Alfredo	Engineer	Wastewater Design	(313) 297-5940	Lava.Alfredo@glwater.org

Site Name	Pump Station No 1 at GLWA's WRRF, 9300 W Jefferson Ave, Detroit, MI 48209
If Facility, Facility Address	Multiple locations
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Pump Rehabilitation
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

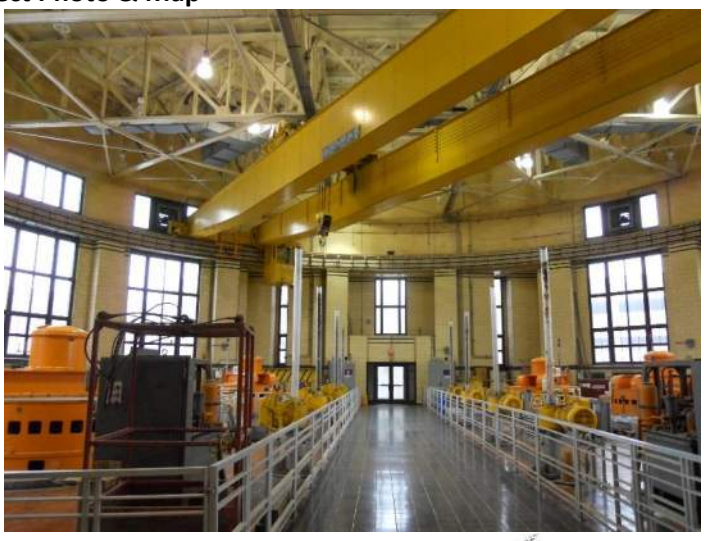
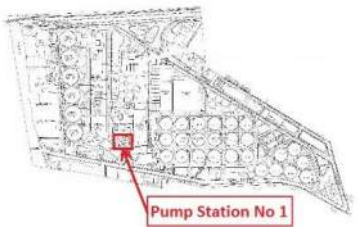


Photo Caption

Pump Station No 1 Pump Gallery



Pump Station No 1 Location

Problem Statement

The GLWA's Water Resources Recovery Facility (WWRF) comprises of two pumping stations: The Pump Station No. 1 (PS-1) and Pump Station No. 2 (PS-2). The Main Lift Pumps at Pump Station No. 1 are currently experiencing considerable loss of pumping capacity caused by the wear and tear of the impeller and wear rings, etc. Based on the Pumping Capacity Technical Memorandum (a study conducted by Malcolm Pirnie to determine the long-term pumping capacity from Pump Station Nos. 1 and 2) the pumping capacity will decline by about 8% of its design capacity by the end of the 5-year cycle. The most recent major rehabilitation of these pumps at PS-1 was done about ten years ago in 2004 and 2005 as part of PC-744 project (DWP 1007). The long-term pumping capacities for these pumps depend on the recommended rehabilitation schedule of each pump. Therefore, a major refurbishment or replacement of the existing equipment is needed in order to ensure reliability and efficiency of this operation.

This project is necessary because the National Pollutant Discharge Elimination System (NPDES) and the Michigan Department of Environmental Quality (MDEQ) require WWRF to treat 1,700 mgd of raw wastewater during wet weather events. NPDES permits are required by the Federal Water Pollution Control Act Amendments of 1972. Further reduction of the already reduced pumping capacities of these pumps may not meet the current MDEQ-NPDES requirements.

History / Background	GLWA operate two raw sewage pumping stations: PS-1 and PS-2, at the Water Resources Recovery Facility. Raw wastewater (influent) from the collection system flows to the Influent Pumping Station through the Detroit River Interceptor (16 feet in diameter), Oakwood Interceptor (12.5 feet in diameter) and North Interceptor East Arm (NIEA). The main Influent Pumping Station No. 1 (PS-1) was constructed in the 1930s. PS-1 has eight constant speed pumps of various capacities (six were installed in the 1940s and two more were added in 1956) and has a Firm Capacity (largest pump out of service) of 1,225 mgd during wet weather event. The Influent Pumping Station No. 2 (PS-2) has eight raw sewage pumps (combination of variable and constant speed pumps) with a Firm Capacity of 805 mgd during wet weather event. Based on the Pumping Capacity Technical Memorandum, the Overall Long Term WWRF Pumping Capacity (PS-1 and PS-2) has a Total Firm Capacity of 1,752 mgd during wet weather event, above the 1,700 mgd NPDES permit requirement. The pumps at PS-1 were rehabilitated in 2004 and 2005 under PC-744 project (DWP 1007) and Pump No 10 at Pump Station No. 2 was installed in year 2003 under GLWA Contract PC-740.
Preliminary Scope of Work	It is recommended that the scope of work be performed in two stages: Stage 1 – Study/Design – The work shall include identification of all major parts including impellers and wear rings to be refurbished for each pump and all related appurtenances. The work also shall include the sequencing of pump shutdown to ensure WWRF meet the NPDES required permit throughout the rehabilitation period. Stage 2 – Construction – The construction of this project shall follow the sequencing of pump shutdown to ensure WWRF meet the NPDES required permit throughout the rehabilitation period.
Related projects currently underway or planned	PC-757 – Rehabilitation of Primary Clarifiers Tanks, Drain Lines, Electrical/Mechanical Building and Pipe Gallery. PC 789 – Pump Station No. 1 Rack & Grit Building, MPI 1, and JSS Improvements. PC-795 – Pump Station No. 2 Pumping Improvements.
Potential Challenges	Maintaining the adequate pumping capacity during construction will be the most significant challenge on this project.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	The WRRF Pump Station No 1 pumps are old and due to normal operation wear and tear over the years resulted is rehabilitation needs. The pumping capacity is declining and rehabilitation is critical to meet MDEQ permit requirements.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 9/1/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design and Const. Assist.	In Proposed CIP	$0	$600	$350	$125	$100	$0	$0	$1,175	4 Year
Construction	In Proposed CIP	$0	$0	$5,000	$5,000	$1954	$0	$0	$11,954	3 Years
Year Totals		$ 0	$ 600	$5,350	$5,125	$2,054	$ 0	$ 0	**$13,129**	4 Years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The main objective of this project proposal is to bring PS-1 into compliance with MDEQ- NPDES for long-term wet weather pumping capacity. To achieve this goal, the refurbishment or replacement of the existing pumps and its associated equipment are necessary. There are two alternative solutions to meet this objective: A. Rehabilitate all the existing raw sewage pumps and related appurtenances. B. Replacement of all the existing raw sewage pumps with new pumps.
Description of Alternative Evaluation	Implementation of solution "A" will result in a more reliable and efficient operation, reduced maintenance cost and less equipment down time. This will also enable WWRF to maintain the Overall Long term WWRF Pumping Capacity of 1,752 mgd during wet weather condition, in compliance with the 1,700 mgd NPDES permit requirement.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Pump impellers have passed useful life over 10 years
2) Performance (Service Level / Reliability)	4	Pumping capacity is declining
3) Regulatory (Environmental / Legal)	5	If the pumping capacity further reduces, there is an immediate risk of non-compliance for NPDES permits.
4) O&M	4	Significant O&M is required to keep the pump station in service.
5) Public Health & Safety	4	NPDES permit violations would cause water quality impacts.
6) Public Benefit	3	Public will benefit from improved water quality in local receiving water bodies.
7) Financial	4	Exposure to multiple fines for permit violations
8) Efficiency	4	Rehabilitation will provide improved pumping capacity and will result in increased efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	5	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	4	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	4	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	4/13/2017	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA uthority
rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 211006

CIP #: 1312

Project Title: **Rehabilitation of Main Lift Pumps at Pump Station No. 1**

Contract Number:

Description: Rehabilitate Pump Station No. 1 pumps to maintain necessary pump capacity per NPDES and MDEQ mandates/regulations.

Lead Division:

Division Leader:

Project Manager: Beena Chackunkal

Phone: 313 297 9825

Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 13,129

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	9	77	74	30	-	-	190
601997	Capital Allocation: Fringe Benefits	40%	-				3	31	30	12	-	-	76
601998	Capital Allocation: Nonpersonnel	5%	-				0	4	4	1	-	-	9
616900	Construction		-				-	4,888	4,893	1,911	-	-	11,692
617950	Contractual Engineering Service		-				587	350	125	100	-	-	1,162
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	600	5,350	5,125	2,054	-	-	13,129
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-		600	5,350	5,125	2,054	-	-	13,129
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 600	$ 5,350	$ 5,125	$ 2,054	$ -	$ -	$ 13,129

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17 and Prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$0	$600	$5,350	$5,125	$2,054	$0	$13,129

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

PAGE 1

GLWA
Great Lakes Water Authority

Project Title	**Replacement of Bar Racks and Grit Collection System at Pump Station No. 2 (CIP 1314)**
Project Significance	The work consists of rehabilitation/replacement of Bar Racks and Grit Collection System including existing 8 bar screens and their associated motors and electrical panels and grit collection system as necessary to meet the long-term wet weather requirements at thePS-2. These improvements will enable WWTP to be in compliance with NPDES permit

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **8/2/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Beena Chackunkal, P.E.	Engineer	WWOG-Engineering
	Beena.Chackunkal@glwater.org		297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Alfredo Lava	Engineer	Wastewater Design	313-297-5940	Alfredo.Lava@glwater.org

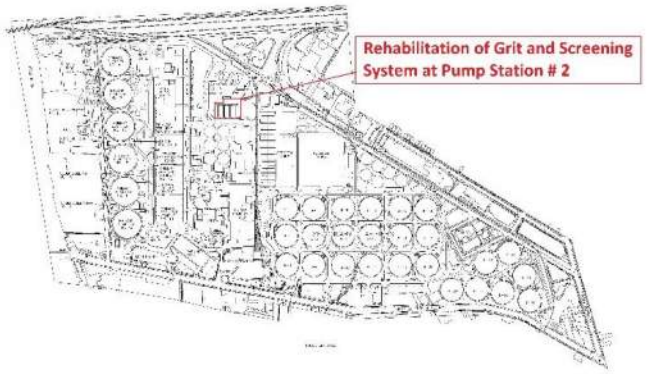
Site Name	Wastewater Treatment Plant
If Facility, Facility Address	9300 W. Jefferson Ave., Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Pump Station No. 2 Bar Rack and Grit Collection System
Previous Project Status	Active
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

PS-2 Bar Screens problems include screening conveyor belt failure resulting in frequent shutdown and significant maintenance man-hours. Grit chamber drains get clogged frequently resulting in significant grit accumulation.



Map of Pump Station # 2 Grit Removal and Screening System at the WWTP

Problem Statement	The Wastewater Treatment Plant Pump Station No. 2 Rack & Grit collection system needs modification due to the problems draining the chambers with existing system. Failure of shear pins and accelerated wearing and tearing of the bar racks cause significant amount of downtime resulting in permit violation. Improper transport of collected screenings on the respective conveyor has been ongoing problem. Currently, some of the grit chamber cannot be emptied out due to the clogged drain. This prevent the grit chamber to be drained and cleaned out as frequently as needed causing grit to carry over and wear on the downstream process and equipment. The grit system existing configuration of the drain needs to be modified to allow better drainage and avoid clogging.
History / Background	The Pump Station No. 2 Rack and Grit Collection system have been in service for almost twenty years. The equipment are near the end of its useful life. Improper transport of collected screenings has been ongoing problem and rags and other floatable materials are not screened thoroughly. The condition and reliability of the Pump Station No. 2 Grit System was inspected and in conclusion grit crane was upgraded in 2002 by PC-744/DWP-1006. A follow up field investigation was done under CS-1372, Task #69 to prepare 2010 Need Assessment report for DWWTP. The following is the recommendation made under CS-2010 includes:

	• The HVAC system was found in good condition but needs some rehabilitation due to its ending life cycle. • Modifications to the existing Grit removal system due to draining the chambers with the existing system e,g. Chambers cannot be emptied due to clogged drains. • Grit carry over cause deterioration of the downstream process and equipment • Rehabilitation/Replacement of screening belt since the equipment is nearing to its useful life. • Rehabilitation of Grit Channel Drain Gate stems. The bar screen foundations, screen frames, and conveyance chutes in PS-2 have been in service for approximately twenty years. Based on field observations by In-house staff for "Rehabilitation of Rack Screen System," project, the bar screen foundation and frame appeared to be structurally sound, and in good condition. No signs of wear on the foundation or structure were observed. Problems with improper collection of the screenings have been reported by plant personnel. Upon investigation, it was observed that the rags and floatable material are not being screened properly. The collected material either accumulates at the top edge of the chute or falls back on the bar rack or on the inner side of the chute. After scraping through the wiper, the collected material is not being dropped on the belt. Improper screening is due to misalignment of wiper assembly, wear on the chain assembly, racks, guides, and increased clearance of the moving parts.
Preliminary Scope of Work	Study of current Bar Screen and Grit Collection system at Pump Station No. 2: Provide alternatives transport system as per current requirements and recommendations. Study and design with informal system, if needed. Design and install the grit and screening conveyor system, bar screen, buckets wear shoes, and chains, etc. Review the additional need for Ovation System, if needed. The work shall also include the sequencing of pump with the corresponding bar screen shutdown to ensure WWTP meet the NPDES required permit throughout the rehabilitation period. The scope of work be performed for bar screens be in two stages: Stage 1 – Study/Design – The work shall include identification of all major parts including wiper assembly, chain assembly, racks, guides, motors and electrical panels to be refurbished or replaced for each bar screen and any other related incidental items. The work also shall include the sequencing of pump and corresponding bar screen shutdown to ensure WWTP meet the NPDES required permit throughout the rehabilitation period. Stage 2 – Construction – The construction of this project shall follow the sequencing of pump and corresponding bar screen shutdown to ensure WWTP meet the NPDES required permit throughout the rehabilitation period.
Related projects currently underway or planned	PC-757: Rehabilitation of Primary Clarifiers & Pipe Gallery PC 789 – Pump Station No. 1 Rack and Grit Building, MPI and JSS Improvements PC 795 – Pump Station No. 2 Improvements, CS-1481 Task-18 – Rehabilitation of

	grit and Screening System at Pump Station No. 2 and Rehabilitation of Sampling Sites at WWTP.
Potential Challenges	Maintaining the MDEQ-NPDES required capacity during the construction phase of the project.
Other – important project information, photos, etc. not fitting in other	The CIP Project Proposal – CIP 1314 – "Replacement of Bar Racks at Pump Station No. 2" and CIP Project Proposal – CIP 1223 – "Rehabilitation of Grit and Screening System at PS-2 and Rehabilitation of Sampling Sites at WWTP" are combined into one project under CIP 1314. That combined new budget for CIP 1314 (CIP 1223 and 1314) has a total amount of $11,617,000. The design of "Rehabilitation of Sampling Sites" is completed and will be bid separately for construction. The previous design for Bar Rack System by Sigma under As Needed Engineering Services Contact task order will not proceed for construction as designed. An engineering decision to have a fresh look and start new study, design and construction project through this CIP project will proceed. The original budget for CIP-1314 is $3.667M. The $6.0M CIP budget transfer was made from CIP-1223. The new revised new CIP-1314 budget is $9.667

Additional Reference Documents: Use button below or include file path to network location.

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	2 - Performance (Service Level/Reliability)
Explanation	Plant operations report on the failure of shear pins and accelerated wearing and tearing of the bar racks causing downtime for the maintenance and violation of the permit

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 8/2/2016 **Prepared By** Wastewater Design Group **Division** Wastewater Operations

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, and Const. Assist.	In Proposed CIP	$0	$650	$400	$250	$100	$0	$0	$1,400	4 Year
Construction	In Proposed CIP	$0	$0	$2500	$3050	$2717	$0000	$0	$8,267	3 Year
Year Totals		$ 0	$ 650	$2,900	$3,300	$2,817	$ 0	$ 0	**$9,667**	4 Year

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$ 0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative is to build a new Grit Removal and Screening Facility.
Description of Alternative Evaluation	The construction of new grit removal and screening system will be much higher than rehabilitation
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Equipment is over 20 years old
2) Performance (Service Level / Reliability)	4	Level of service is very poor
3) Regulatory (Environmental / Legal)	4	NPDES permit mandates facilities to be in good operating condition to meet permit requirements.
4) O&M	3	This will reduce O&M costs
5) Public Health & Safety	3	Equipment down leads to permit violations and degradation of environment for public health at risk.
6) Public Benefit	3	Improves water quality
7) Financial	3	O&M cost savings
8) Efficiency	3	This will replace inefficient equipment with more efficient and easy to maintain equipment increasing operational efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	4	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	3	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	3	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	3	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	3	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	10/12/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal, P.E.	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA uthority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 211007

CIP #: 1314

Project Title: **Replacement of Bar Racks and Grit Collection at Pump Station #2**

Contract Number:

Description: Replace / Rehabilitate 8 bar racks, motors and control panels for grit collection. Required to meet NPDES permit requirements in wet weather situations.

Lead Division:

Division Leader:

Project Manager: Beena Chackunkal

Phone: 313 297 9825

Department Charged: Water X Sewage

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Both Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 9,667

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	10	47	53	45	-	-	155
601997	Capital Allocation: Fringe Benefits	40%	-				4	19	21	18	-	-	62
601998	Capital Allocation: Nonpersonnel	5%	-				1	2	3	2	-	-	8
616900	Construction		-				-	2,413	2,973	2,651	-	-	8,037
617950	Contractual Engineering Service		-				635	420	250	100	-	-	1,405
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	650	2,900	3,300	2,817	-	-	9,667
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-	-	650	2,900	3,300	2,817	-	-	9,667
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 650	$ 2,900	$ 3,300	$ 2,817	$ -	$ -	$ 9,667

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$650	$2,900	$3,300	$2,817	$0	$0	$9,667

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA Great Lakes Water Authority

Project Title	**Freud and Connor Creek Pump Station Improvements CIP 1315**
Project Significance	The primary objective of this project is to study the overall performance of Connor Creek and Freud sewage pumping stations and develop design, and build an operational strategy to optimize the utilization of interconnected piping and operation between both pumping stations and the Connor Creek Retention and Treatment Basin.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **4/12/17** **Project Origin** Condition Assessment

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	Connor Creek and Freud pumping stations
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Study, Design and Construction
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Problem Statement	During some of the heavy storm events GLWA experienced problems in optimizing the transport capacity of the collection system. Because of the inner-connected piping and operations between Connor Creek Sewage Pumping Station, Freud Sewage Pumping Station, Fairview Sewage Pumping Station and Connor Creek Retention and Treatment Basin, GLWA contacted Metco Services Inc. to study the overall operational issues for these facilities and to develop an operational strategy to optimize the utilization of these facilities. This project will address the recommendations of this study to improve system operations, efficiency and reliability.
History / Background	The Connor Creek Pump Station (CCPS) was originally built in 1928 with four storm water pumps, each with a rated capacity of 500 cubic feet per second (cfs). The CCPS was expanded in 1940 adding four more pumps of the same capacity. The pump station currently has a total capacity of 4,000 cfs and a firm capacity of 3,500 cfs. The pumps are primed using a vacuum system that relies on the flooding of the discharge channel siphon to maintain a water seal, which allows the pumps to be primed. Since the Conner Creek CSO RTB went into operation in November 2005, the discharge channel for the CCPS is drained when the CC RTB is dewatered. Therefore, the vacuum priming system cannot prime the pumps. This results in the CCPS pumps being unable to start until the discharge channel is flooded and the vacuum priming system has a seal on the discharge to prime the pumps. The Freud Pump Station (FPS) was originally built in 1954 with eight storm water pumps, each with a 450 cfs capacity. Two additional pumps were subsequently installed for dewatering and to act as sanitary pumps during dry weather flows. These two pumps are rated at 35 cfs and 20 cfs and are not operated when the storm water pumps are in service. Under the current operating protocol, the FPS is operated first and results in water flowing to the discharge channel of the CCPS, providing sufficient water to ensure submergence of the vacuum siphon block to allow the vacuum system to prime the CCPS pumps. The FPS pumps do not require priming during normal operations. The discharge pipe from each pump is tied to three 14’ x 14’ box conduits which transport flow to the CC RTB. The crown elevation of these conduits is approximately 95’ and the lowest ground elevation along these conduits ranges from 96’ to 100’. Surcharging and flooding have been reported when the CC RTB is filled to the overflow elevation of 98’ and more than three of the FPS storm water pumps are in operation

Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Provide basis of design, and final design for an operational strategy to optimize the utilization of interconnected piping and operation between Connor Creek and Freud pumping stations and the Connor Creek Retention and Treatment Basin. Provide construction of the emerging project and construction assistance during construction of the emerging project.
Related projects currently underway or planned	
Potential Challenges	Meeting the collection system transport capacity during the construction
Other – important project information, photos, etc. not fitting in other	

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

3. PROJECT DRIVER

Primary criteria driving project	2 - Performance (Service Level/Reliability)
Explanation	During peak wet weather there is a potential for the sewers to surcharge and flood the street.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 10/12/2016 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	Not yet started	$100	$500	$0	$0	$0	$0	$0	$600	
Design	Not yet started	$340	$3,400	$0	$0	$0	$0	$0	$3,740	
Construction	Not yet started	$5,636	$0,000	$5,100	$2,460	$1,000	$0	$0	$14,196	4 Yr.
C (CON-109)	Under Procurement	$1,964	$2,000	$0	$0	$0	$0	$0	$3,964	
Year Totals		$8,040	$5,900	$5,100	$2,460	$1,000	$ 0	$ 0	**$22,500**	4 Yr.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Phase Duration

Double-click here to update table calculations

Notes

5. ALTERNATIVES EVALUATION

Alternative	Do Nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	NA

Please describe any other alternatives evaluated:

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Major rehabilitation is immediately needed
2) Performance (Service Level / Reliability)	5	Significant capacity issues during wet weather events
3) Regulatory (Environmental / Legal)	5	Measurable positive impact such as mitigation of CSO, compliance with NPDES permit.
4) O&M	3	Reduction in reactive maintenance activities.
5) Public Health & Safety	3	Project will have a moderate positive impact on public health and safety and environment
6) Public Benefit	4	Not implementing the project will have a chance to have a major negative public impact
7) Financial	2	Unlikely to have wide budget implications
8) Efficiency	2	Project will have little or no time and cost saving

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	4	9.60	Bad conditions
2) Performance (Service Level / Reliability) 15%	5	4	12.00	Known problems
3) Regulatory (Environmental / Legal) 18%	5	**5**	18.00	Legal problems recently
4) O&M 11%	3	3	6.60	O&M Moderate
5) Public Health & Safety 17%	3	4	13.60	Related to basement flooding
6) Public Benefit 8%	4	5	8.00	Related to basement flooding
7) Financial 10%	2	5	10.00	Expensive lawsuits
8) Efficiency 9%	2	1	1.80	No significant impact
Total Modifier Points				
Total Score			**79.60**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
J. Caldwell	4/12/17	Added CON-109 to BCE Costs Per MD

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:					
Design &Construction: System Control Center Contact Persons:					
Biren Saparia	Manager	Mini Panicker	Engineer	Thomas Hall	Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker	10/12/2016
	Mini Panicker	
Manager	Biren Saparia	10/12/2016
	Biren Saparia	
Chief	Cheryl Porter	10/12/2016
	Cheryl Porter	

GLWA uthority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 232002

CIP #: 1315

Project Title: **Freud and Conner Creek Pump Station Improvments** **Contract Number:**

Description: Build strategy to optimize the interconnected pipes.

Lead Division: Division Leader:

Project Manager: Mini Pinacker Phone: 313 267-8996 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 14,460 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	50	43	21	8	-	-	121
601997	Capital Allocation: Fringe Benefits	40%	-				20	17	8	3	-	-	49
601998	Capital Allocation: Nonpersonnel	5%	-				2	2	1	0	-	-	6
616900	Construction		-			7,600	1,928	5,038	2,431	988	-	-	17,984
617950	Contractual Engineering Service		-			440	3,900	-	-		-	-	4,340
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 8,040	5,900	5,100	2,460	1,000	-	-	22,500
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-	8,040	5,900	5,100	2,460	1,000	-	-	22,500
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ 8,040	$ 5,900	$ 5,100	$ 2,460	$ 1,000	$ -	$ -	$ 22,500

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17 and Prior	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$8,040	$5,900	$5,100	$2,460	$1,000	$0	$0	$22,500

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA
Great Lakes Water Authority

Project Title	**Detroit River Interceptor Evaluation and Rehabilitation – CIP 1329**
Project Significance	Evaluation of the existing condition of the Detroit River interceptor (DRI), and rehabilitation/replacement of portions based on the evaluation results are essential to optimize the transportation capacity of the GLWA collection system and to increase its life expectancy.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **10/11/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	Sewers and Interceptors
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Construction
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.

Include caption for the map. Map is especially important for linear assets.

Problem Statement	Recent inspections of portions of Detroit River Interceptor raised concerns due to high PAPC ratings indicating structural and corrosion issues within the interceptor. This project will help us to evaluate the existing condition and will further assist in rehabilitating and or replacing portions with structural deficiencies. As per the NPDES permit, GLWA is required to utilize the available sewage system transportation capabilities, to the maximum extent possible, for the delivery of combined sewage to the treatment facilities. Evaluation of DRI will reveal if there are any transportation capacity limitations in DRI due to sludge or mineral deposits and the need for necessary cleaning to optimize the transportation capacity.
History / Background	The installation of some of the GLWA interceptors and sewers are dated back to 1912 under various contracts. Detroit River Interceptor inspection was recently completed in 5 different phases and there were portions deteriorated with visible surface aggregates, attached encrustation and infiltration. Some trunk sewer inspection revealed sludge deposition with reduced transportation capacity. Inspections of sewers to reveal the existing conditions are necessary and shall be done every 5 to 7 years.

	Recommendations from these inspections may reveal further need for cleaning, rehabilitation or replacement.
Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Provide CCTV and or sonar inspection of the DRI to reveal the existing conditions as per the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment Certification Program (PACP) standards, evaluate the existing conditions, and provide the necessary cleaning/rehabilitation/replace to optimize the design capacity of the collection system, minimize the inflow and infiltration into the collection system, and extend the service life.
Related projects currently underway or planned	GLWA - CS-068, DWSD - DWS-889, DWSD-DWS-876
Potential Challenges	DRI may have flow control challenges for both inspection and rehabilitation.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	Recent inspections revealed portions with encrustation and deterioration.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.
Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 10/10/2016 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	Not yet started	$321	$300	$150	$150	$0	$0	$0	$921	
Design	Not yet started	$0	$500	$250	$250	$0	$0	$0	$1,000	
Construction	Not yet started	$0	$9,200	$4,600	$4,600	$0	$0	$0	$18,400	3 Yr.
Year Totals		$ 321	$10,000	$5,000	$5,000	$ 0	$ 0	$ 0	**$20,321**	3 Yr.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Do Nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	NA

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate inspection and rehabilitation required since this is a major interceptor and some areas shows structural deficiencies
2) Performance (Service Level / Reliability)	4	Likelihood of serious inconveniences and business impacts for affected customers.
3) Regulatory (Environmental / Legal)	4	Compliance failure would result in environmental impact.
4) O&M	3	Reduction in reactive maintenance activities.
5) Public Health & Safety	3	Project will have a moderate positive impact on public health and safety and environment
6) Public Benefit	4	Not implementing the project will have a chance to have a major negative public impact
7) Financial	4	Likely to have wide budget implication if there is a collapse
8) Efficiency	2	Project will have little or no time and cost saving

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	5	12.00	Asset exceeded design life
2) Performance (Service Level / Reliability) 15%	4	4	12.00	High risk of failure due to age
3) Regulatory (Environmental / Legal) 18%	4	3	10.80	Failure would result in legal issues
4) O&M 11%	3	1	2.20	Minimal current O&M
5) Public Health & Safety 17%	3	3	10.20	Moderate chance of failure
6) Public Benefit 8%	4	4	6.40	Part of strategic plan; major negative impact of failure
7) Financial 10%	4	5	10.00	Failure would be expensive
8) Efficiency 9%	2	1	1.80	No significant impact
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**65.40**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker	10/11/2016
	Mini Panicker	
Manager	Biren Saparia	10/11/2016
	Biren Saparia	
Chief	Cheryl Porter	10/11/2016
	Cheryl Porter	

GLWA Great Lakes Water Authority

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 222002

CIP #: 1329

Project Title: **Detroit River Interceptor (DRI) Evaluation and Rehabilitation**

Contract Number:

Description: Evaluation of the existing condition of the Detroit River interceptor (DRI), and rehabilitation/replacement of portions based on the evaluation results are essential to optimize the transportation capacity of the GLWA collection system and to increase its life expectancy.

Lead Division: Waster Water Engg

Division Leader:

Project Manager: Mini Panicker

Phone: 313-267-8996

Department Charged: Water X Sewage Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018 to 2022 $ 20,000

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-			-	$ 9,200	$ 4,600	$ 4,600	$ -	$ -	$ -	18,400
617950	Contractual Engineering Service		-			$ 321	$ 800	$ 400	$ 400	$ -	$ -	$ -	1,921
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										
	Project Total		$ -	$ -	$ -	$ 321	$ 10,000	$ 5,000	$ 5,000	$ -	$ -	$ -	$ 20,321

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Water I&E		-											
Sewer Construction Bonds		-			-	321	10,000	5,000	5,000	-	-		20,321
Sewer I&E		-											
	Project Total	$ -	$ -	$ -	$ -	$ 321	$ 10,000	$ 5,000	$ 5,000	$ -	$ -	$ -	$ 20,321

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$321	$10,000		$5,000	$5,000	$0	$0	$0	$20,321

0

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

Project Title	**Schedule Replacement Program of Critical Assets (CIP - 1330)**
Project Significance	This program is to perform the scheduled replacement as per the Needs Assessment for critical asset replacement and planned small capital projects (SCP) at WRRF and WW operations

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **4/13/2017** **Project Origin** O&M Request

Project Manager/Sponsor	Beena Chackunkal, P.E.	Engineer	WWOG-Engineering
	Beena.Chackunkal@glwater.org		297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Ravi Yelamanchi	Engineer	Wastewater Design	297-5965	Ravi.Yelamanchi@glwater.org

Site Name	WRRF, Collection System, and CSFO Facilities
If Facility, Facility Address	Various Wastewater Facility Locations
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Wastewater System wide
Previous Project Status	Active
Current CIP Project Status	Active Ongoing

2. PROJECT INFORMATION

Project Photo & Map

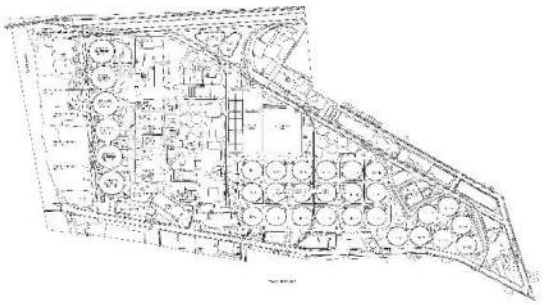


Photo Caption

Map of the WRRF

Map of the collection system and Combined Sewer Overflow Retention Basins and Screening Disinfection Facilities.

Problem Statement

Asset Management Program recently started to optimize value of assets usage and performance at WRRF and CSO basins. All assets were audited in 2001 and 2004 of all equipment and developed replacement program at regular intervals, long range intervals and budget estimates based on life expectancy. These audits and SRP will assist future planning and execution of rehabilitation/ replacement projects for all WRRF facilities, of electrical equipment, I & C and network devices, roads and buried infrastructure. SRP is the requirement for WRRF facilities for NPDES permit and renewals. The planned small capital projects <$1 M utilize this CIP budget.

At present construction of two capital projects has been identified to be tapped from CIP# 1330 budget:

(a) CON-143, Complex-II Incineration Building Roof Replacement due to fire damage during the March 2016 fire incident. The design of this project was completed by NTH under Walsh's PC-791 fire emergency work order. The bid of this construction contract was advertised on MITN and a single bid was received for $1,779,400. This is an emergency projects and work will start immediately.

(b) SCP-001, Construction of 19 MCC's and Unit Substation EB-26 in the Incineration Complex II. The design of 19 MCC's was completed under contract CS-1432A, Task-34E and Unit Substation EB26 under contract CS-1432A, Task-34C respectively. The construction of this project is currently under consideration to be added to construction project from CIP#1311, design contract CS-060. If this design package is added to the CS-060 bid package then this project needs to be deleted from the CIP#1330 list of projects.

History / Background	WRRF has audited twice in past for all equipment and supporting facilities, considered to maintain process. These audits helped to assess equipment repair and future planning and execution of rehabilitation/replacement projects at WRRF facilities
Preliminary Scope of Work	The scope of SRP is to develop a comprehensive database. SRP implementation procedures that includes replacement intervals for key Equipment and facilities, long- range replacement schedules, yearly budget Estimates, O & M annual costs, Equipment Replacement Criteria and conclusions and recommendations.
Related projects currently underway or planned	At present 2 capital projects has been identified to be tapped for CIP#1330 budget: (a) CON-143, Complex-II Incineration Building Roof Replacement construction project due to fire damage, design has been recently completed by NTH under emergency fire restoration. (b) SCP-001, Construction of 19 MCC's and Unit Substation EB-26 in the Incineration Complex II. The design of 19 MCC's was completed under contract CS-1432A, Task-34E and Unit Substation EB26 under contract CS-1432A, Task-34C respectively. Some identified future Small Capital Projects (SCP) in the Needs Assessment Report: Misc. Improvements at WRRF Lift Stations - $1M, Septage Disposal Area Improvements - $500k., Sludge Blanket Monitors at Primary Clarifiers – $500k. Misc. Improvements at Complex A Gravity Thickeners - $1 M, Rehab of Various C-II Areas in the Basement- $1M, Misc. Building Improvements - $1 M. Rehabilitation of Sampling Facilities - $1 M, Equipment Testing and Inspection - $1 M. Puritan Fenkell CSO Basin Effluent Valve Replacement -$250K.
Potential Challenges	Depending on type of project, long term or short term projects equipment or part of process areas need to shut down.
Other – important project information, photos, etc. not fitting in other	GIS, Section Maps and Gate Books are available for reference

Additional Reference Documents: Use button below or include file path to network location.

Based on recommendations from SRP, replacement intervals, long range replacement schedule, key process, electrical equipment, I&C, network devices, roads and buried infrastructure be replaced.

3. PROJECT DRIVER

Primary criteria driving project	2 - Performance (Service Level/Reliability)
Explanation	To reduce equipment and process down times of critical assets

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 8/2/2016 **Prepared By** Wastewater Design Group **Division** Wastewater Operations

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, and Const. Assist.	In Proposed CIP	$0	$500	$500	$500	$500	$500	$0	$2,500	Phase Duration
Construction	In Proposed CIP	$0	$1721	$4500	$4500	$4500	$4500	$0	$19,721	Phase Duration
Construction CON 143	In Proposed CIP	$500	$1279	$0000	$0000	$0000	$0000	$0	$1,779	Phase Duration
Construction SCP-001	In Proposed CIP	$0	$1500	$0	$0	$0	$0	$0	$1,500	Phase Duration
Year Totals		$ 500	$5,000	$5,000	$5,000	$5,000	$5,000	$ 0	**$25,500**	Project Duration

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$ 0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Cost effective and trade off analysis for equipment replacement alternative be performed to make recommendation
Description of Alternative Evaluation	a) Most of the large equipment replacements will be addressed through the CIP Projects and some medium size equipment under Small Capital Projects b) SRP Data base history will be utilized for reference manual for equipment's operational life and rehabilitation/replacement history
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Equipment status- evaluation for repair and replacement
2) Performance (Service Level / Reliability)	3	Optimize the equipment operation uptime
3) Regulatory (Environmental / Legal)	3	NPDES permit mandates facilities to be in good operating condition to meet permit requirements.
4) O&M	4	This planned Operation and Maintenance activity
5) Public Health & Safety	3	Equipment down leads to permit violations and degradation of environment for public health at risk.
6) Public Benefit	3	Improved air emissions and water quality effluents.
7) Financial	3	O&M cost savings
8) Efficiency	4	SRP will replace inefficient with more efficient and easy to maintain equipment increasing operational efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	3	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	3	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	3	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	3	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	4/13/2017	Document updated

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal, P.E.	Date
Manager	Digital signature Manager Name	Date
Chief	Digital signature Chief Name	Date

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 260300

CIP #: 1330

Project Title: **Scheduled Replacement Program of Critical Assets** **Contract Number:**

Description: Program to replace critical assets and planned small capital projects based upon needs assessement

Lead Division: Waste Water Engg Division Leader:

Project Manager: Beena Chackunkal Phone: 313-297-9825 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018 to 2022 $ 25,000 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 69	$ 69	$ 69	$ 69	$ 69	$ -	$ 345
601997	Capital Allocation: Fringe Benefits	40%	-				28	28	28	28	28	-	138
601998	Capital Allocation: Nonpersonnel	5%	-				3	3	3	3	3	-	17
616900	Construction		-			500	$ 4,400	$ 4,400	$ 4,400	$ 4,400	$ 4,400	$ -	22,500
617950	Contractual Engineering Service		-			$ -	$ 500	$ 500	$ 500	$ 500	$ 500	$ -	2,500
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										
	Project Total		$ -	$ -	$ -	$ 500	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ -	$ 25,500

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Water I&E		-											
Sewer Construction Bonds		-			-	500	5,000	5,000	5,000	5,000	5,000		25,500
Sewer I&E		-											
Project Total		$ -	$ -	$ -	$ 500	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ -	$ 25,500

PROJECTED (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$500	$5,000	$5,000	$5,000	$5,000	$5,000	$0	$25,500

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes [ ] No [0] CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

Project Title	**Northeast Pump Station Improvements (CIP 1331)**
Project Significance	This project will include replacement of the inlet gate valves, installation of Pump No. 3 and new chopper pumps, repair of the original service elevator, rebuilding of the spare pumps, repair and upgrade of the wet well, repair and upgrade of the dry well, repair and upgrade of the Gate House air handling systems, emergency bypass of the station etc.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **10/11/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	Northeast Sewage Pumping Station
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Study, Design and Construction
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.

Include caption for the map. Map is especially important for linear assets.

Problem Statement	Some of the equipment in the Northeast Sewage Pumping Station are the original one when the station was built in 1969 and some are coming into the final stages of their lifecycle. Northeast is the only station to handle sewage for the eastside suburban area. If this station is shutdown, sewage would backup in the suburban area, so a study is needed for an emergency bypass of the station. This project will address the needs for a complete rehabilitation of the station with an emergency bypass option
History / Background	The Northeast Sewage Pumping Station was built under contract PC-216. It had only three sanitary pumps and another sewage pump was added under PC-736. Later on OMID added 2 more sewage pumps. Recently under OMID Contract-3,OMID performed the removal of existing discharge piping; installation of a new discharge pipe manifold system; structural alterations to accommodate filling the east and west sides of the existing discharge chamber to support deteriorated external walls, replacement of the NESPS roof structure over the east and west sides; placement of new concrete walls and beams to form a centralized discharge opening to the PCI-4 sewer, construction of precast concrete walls above the central chamber and precast roof slab panels for permanent access; and other associated work to accomplish the repairs etc. This proposed rehabilitation project is to address the rest of the issues affecting the station which was built in 1969

Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Provide basis of design, and final design for a complete rehabilitation for the station with an emergency bypass option. Provide construction of the emerging project and construction assistance during construction
Related projects currently underway or planned	PC-216, PC-672, PC-736
Potential Challenges	Meeting the collection system transport capacity during the construction
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	Some equipment in this station are the original one when the station was built in 1969

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 10/12/2016 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	Not yet started	$0	$780	$0	$0	$0	$0	$0	$780	
Design	Not yet started	$0	$1,628	$0	$0	$0	$0	$0	$1,628	
Construction	Not yet started	$0	$0	$10,920	$13,000	$0	$0	$0	$23,920	3 Yr.
Year Totals		$ 0	$2,408	$10,920	$13,000	$ 0	$ 0	$ 0	**$26,328**	3 Yr.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Phase Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick) | Do Nothing/Status Quo/Run to Failure

Description of Alternative Evaluation	NA

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Major rehabilitation is immediately needed
2) Performance (Service Level / Reliability)	3	Moderate risk of performance failure
3) Regulatory (Environmental / Legal)	4	Relatively high, but not imminent, risk of causing permit violations
4) O&M	4	Measurable reduction in reactive maintenance activities.
5) Public Health & Safety	3	Project will have a moderate positive impact on public health and safety and environment
6) Public Benefit	2	Project may or may not contribute to GLWA strategic planning
7) Financial	2	Unlikely to have wide budget implications
8) Efficiency	2	Project will have little or no time and cost saving

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	5	12.00	Very bad conditions
2) Performance (Service Level / Reliability) 15%	3	5	15.00	Current performance unacceptable
3) Regulatory (Environmental / Legal) 18%	4	4	14.40	Station is in bad shape
4) O&M 11%	4	4	8.80	O&M would be large if it was done
5) Public Health & Safety 17%	3	4	13.60	Project is needed to improve conditions
6) Public Benefit 8%	2	5	8.00	Bad PR if project cancelled
7) Financial 10%	2	5	10.00	>$5M consequence
8) Efficiency 9%	2	4	7.20	New/up to date equipment will increase efficiency
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**89.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker	10/13/2016
	Mini Panicker	
Manager	Biren Saparia	10/13/2016
	Biren Saparia	
Chief	Cheryl Porter	10/13/2016
	Cheryl Porter	

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 232003

CIP #: 1331

Project Title: **Northeast Pumping Station** **Contract Number:**

Description: Replace inlet gate valves, install Pump #3 and other significant repairs & improvements to this facility

Lead Division: Waste Water Engg Division Leader:

Project Manager: Mini Panacker Phone: 313-267-8996 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: $ 26,328 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 13	$ 59	$ 71	$ -	$ -	$ -	$ 143
601997	Capital Allocation: Fringe Benefits	40%	-				5	24	28	-	-	-	57
601998	Capital Allocation: Nonpersonnel	5%	-				1	3	4	-	-	-	7
616900	Construction		-					$ 10,833	$ 12,897	$ -	$ -	$ -	23,731
617950	Contractual Engineering Service		-				$ 2,389			$ -	$ -	$ -	2,389
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 2,408	$ 10,920	$ 13,000	$ -	$ -	$ -	$ 26,328
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-			-	-	2,408	10,920	13,000	-	-	26,328
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 2,408	$ 10,920	$ 13,000	$ -	$ -	$ -	$ 26,328

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$0	$2,408		$10,920	$13,000	$0	$0	$0	$26,328

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: [ ] Yes [0] No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**North Interceptor East Arm (NIEA) Evaluation and Rehabilitation (CIP 1332)**
Project Significance	Evaluation of the existing condition of NIEA, and rehabilitation/replacement of portions with structural deficiencies based on the evaluation results are essential to optimize the transportation capacity of the GLWA collection system and to increase its life expectancy.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **10/11/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	Sewers and Interceptors
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Construction
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Problem Statement	Recent inspection of 33,900 lineal feet of North Interceptor East Arm (NIEA) by NTH revealed that portions of NIEA has structural damages and exposure of reinforcing steel due to harsh conditions as well as running leaks. This project will help us to evaluate the existing conditions and will further assist in rehabilitating and or replacing portions with structural deficiencies. As per the NPDES permit, GLWA is required to utilize the available sewage system transportation capabilities, to the maximum extent possible, for the delivery of combined sewage to the treatment facilities. Recent inspection by NTH also revealed settled materials restricting the flow. This project will reveal the transportation capacity limitations in NIEA due to sludge or mineral deposits and the need for necessary cleaning to optimize the transportation capacity.
History / Background	The installation of some of the GLWA interceptors and sewers are dated back to 1912 under various contracts. NIEA inspection by NTH recently revealed structural deficiencies and sludge deposits. Detroit River Interceptor inspection was recently completed and there were portions deteriorated with visible surface aggregates, attached encrustation and infiltration. Some trunk sewer inspection also revealed sludge deposition with reduced transportation capacity. Inspections of sewers to reveal the existing conditions are necessary and shall be done every 5 to 7 years. Recommendations from these inspections may reveal further need for cleaning, rehabilitation or replacement.
Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Provide CCTV and or sonar inspection of the NIEA to reveal the existing conditions as per the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment Certification Program (PACP) standards, evaluate the existing conditions, and provide the necessary cleaning/rehabilitation/replace to optimize the design capacity of the collection system, minimize the inflow and infiltration into the collection system, and to extend the service life.
Related projects currently underway or planned	PCI-4, PCI-18, PCI-19,
Potential Challenges	NIEA may have flow control challenges for both inspection and rehabilitation.
Other – important project information, photos, etc. not fitting in other	

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	Recent inspections revealed portions with encrustation and deterioration.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 10/10/2016 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	Not yet started	$0	$330	$340	$90	$0	$0	$0	$ 760	3 yr
Design	Not yet started	$0	$550	$530	$150	$0	$0	$0	$1,230	3 yr
Construction	Not yet started	$0	$10,120	$11,130	$2,760	$0	$0	$0	$24,010	3 yr
Year Totals		$ 0	$11,000	$12,000	$3,000	$ 0	$ 0	$ 0	**$37,130**	3 yr

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

5. ALTERNATIVES EVALUATION

Alternative	Do Nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	NA

Please describe any other alternatives evaluated:

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate inspection rehabilitation required since this is a major interceptor and some areas show structural deficiencies.
2) Performance (Service Level / Reliability)	4	Likelihood of serious inconveniences and business impacts for affected customers.
3) Regulatory (Environmental / Legal)	4	Compliance failure would result in environmental impact.
4) O&M	3	Reduction in reactive maintenance activities.
5) Public Health & Safety	3	Project will have a moderate positive impact on public health and safety and environment
6) Public Benefit	4	Not implementing the project will have a chance to have a major negative public impact
7) Financial	4	Likely to have wide budget implication if there is a collapse
8) Efficiency	2	Project will have little or no time and cost saving

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	5	12.00	Asset exceeded design life
2) Performance (Service Level / Reliability) 15%	4	4	12.00	High risk of failure due to age
3) Regulatory (Environmental / Legal) 18%	4	**3**	10.80	Failure would result in legal issues
4) O&M 11%	3	1	2.20	Minimal current O&M
5) Public Health & Safety 17%	3	3	10.20	Moderate chance of failure
6) Public Benefit 8%	4	4	6.40	Part of strategic plan; major negative impact of failure
7) Financial 10%	4	5	10.00	Failure would be expensive
8) Efficiency 9%	2	1	1.80	No significant impact
Total Modifier Points				
Total Score			**65.40**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Hannah Slabaugh	4/27/2017	Updated format of document, updated Capital Cost Estimate per Mini Panicker update.

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker Mini Panicker	2/1/2017
Manager	Biren Saparia Biren Saparia	2/1/2017
Chief	Cheryl Porter Cheryl Porter	2/1/2017

GLWA Water Authority
ovement Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 222003

CIP #: 1332

Project Title: **North Interceptor East Arm -Evaluation and Rehabilitation** **Contract Number:**

Description: Rehabilitate Interceptor based upon evaluation to optimize throughput and extend life of collection System

Lead Division: Division Leader:

Project Manager: Mini Panacker Phone: 313-267-8996 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 26,000 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 33	$ 36	$ 9	$ -	$ -	$ -	$ 77
601997	Capital Allocation: Fringe Benefits	40%	-				13	14	4	-	-	-	31
601998	Capital Allocation: Nonpersonnel	5%	-				2	2	0	-	-	-	4
616900	Construction		-				$ 10,073	$ 11,069	$ 2,747	$ -	$ -	$ -	23,888
617950	Contractual Engineering Service		-				$ 880	$ 880	$ 240	$ -	$ -	$ -	2,000
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 11,000	$ 12,000	$ 3,000	$ -	$ -	$ -	$ 26,000

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-			-	-	11,000	12,000	3,000	-	-		26,000
Sewer I&E		-											-
	Project Total	$ -	$ -	$ -	$ -	$ -	$ 11,000	$ 12,000	$ 3,000	$ -	$ -	$ -	$ 26,000

(000)	FY 2016-17	FY 2017-18	PROJECTED	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	$0
SDS	$0	$11,000		$12,000	$3,000	$0	$0	$0	$26,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: [ ] Yes [0] No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: **Cost Center** **Object No.** **WSS Project No.:**

S Fund No: **Cost Center** **Object No.** **SDS Project No.:**

GLWA Great Lakes Water Authority

Project Title	**Sewage Meter Design, Installation, Replacement and Rehabilitation Program (CIP 1344)**
Project Significance	Improving meter data reliability, ensuring accurate billing, improving customer service and allow high quality analysis of the system

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **1/26/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Chandan Sood	Manager	System Analytics & Meter Operations
	chandan.sood@glwater.org		313.999.4494
CMG Rep	Name	Title	Division
	Email		Phone

Other Project Team Members

Name	Title	Division	Phone	Email
David Bradwell	Team Leader	System Analytics & Meter Operations	313.999.5911	David.bradwell@glwater.org

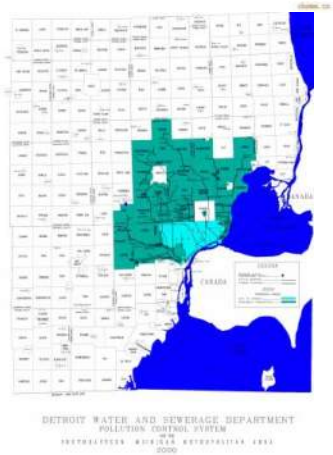
Site Name	Various Meter Locations in Sewer System
If Facility, Facility Address	Facility address.
Service Area	Planning Services
Project Category	Sanitary Collection
Project Type	Study, Design and Construction
Primary Focus	Regional Sewer System
Previous Project Status	N/A
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.



Include caption for the map. Map is especially important for linear assets.

Problem Statement	Lifecycle rehabilitation and replacement of sewage meters to ensure accuracy and reliability. The GLWA sewer metering equipment is composed of various types of metering technology, including Magnetic Flow Tube, Parshall Flume, Ultrasonic, Venturi, and Sonic Hydro ranger. Most of these meters have surpassed their life expectancy for accurate metering, and need to be replaced with new metering technology. This project will assure accurate measuring, a decrease in the number of man hours required for routine and corrective maintenance, as well as repair of structural deficiencies within the metering locations.
History / Background	The GLWA sewer metering equipment is composed of various types of metering technology, including Magnetic Flow Tube, Parshall Flume, Ultrasonic, Venturi, and Sonic Hydro ranger. Most of these meters have surpassed their life expectancy for accurate metering, and need to be replaced with new metering technology.
Preliminary Scope of Work	Replace the existing antiquated metering equipment with new metering equipment

Related projects currently underway or planned	N/A
Potential Challenges	Requires temporary shutdown of large sewers
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project 2 - Performance (Service Level/Reliability)

Explanation Click here to enter short explanation.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Various Assets	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Choose an item.

Date of Cost Estimate	Estimate date	**Prepared By**	Prepared by	**Division**	Division

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, Construction	Not yet started	$500	$500	$500	$500	$500	$500	$0	$3,000	
Year Totals		$500	$500	$500	$500	$500	$500	$0	**$3,000**	

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Choose a method or list another
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance
Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Provide justification.
2) Performance (Service Level / Reliability)	5	Provide justification.
3) Regulatory (Environmental / Legal)	3	Provide justification.
4) O&M	5	Provide justification.
5) Public Health & Safety	3	Provide justification.
6) Public Benefit	3	Provide justification.
7) Financial	5	Provide justification.
8) Efficiency	5	Provide justification.

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	Score 0-5	0.00	Not scored by CIP Committee.
2) Performance (Service Level / Reliability) 15%	5	Score 0-5	0.00	Not scored by CIP Committee.
3) Regulatory (Environmental / Legal) 18%	3	Score 0-5	0.00	Not scored by CIP Committee.
4) O&M 11%	5	Score 0-5	0.00	Not scored by CIP Committee.
5) Public Health & Safety 17%	3	Score 0-5	0.00	Not scored by CIP Committee.
6) Public Benefit 8%	3	Score 0-5	0.00	Not scored by CIP Committee.
7) Financial 10%	5	Score 0-5	0.00	Not scored by CIP Committee.
8) Efficiency 9%	5	Score 0-5	0.00	Not scored by CIP Committee.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Chandan Sood	Date
Manager	Digital signature Chandan Sood	Date
Chief	Digital signature Suzanne Coffey	Date

New CIP 260400

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1344

Project Title: **Sewer Meter Design, Installation, Replacement and Rehabilitation** **Contract Number:**

Description: Improve meter data reliability, ensure accurate billing, improving customer service and enable improved analysis

Lead Division: Division Leader:

Project Manager: Chandon Sood Phone: 313-999-4494 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 2,500 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ 28	$ 28	$ 28	$ 28	$ 28	$ 28	$ -	$ 166
601997	Capital Allocation: Fringe Benefits	40%	-			11	11	11	11	11	11	-	66
601998	Capital Allocation: Nonpersonnel	5%	-			1	1	1	1	1	1	-	8
616900	Construction		-										-
617950	Contractual Engineering Service		-			$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ -	480
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-			$ 380	$ 380	$ 380	$ 380	$ 380	$ 380	$ -	2,280
	Project Total		$ -	$ -	$ -	$ 500	$ 500	$ 500	$ 500	$ 500	$ 500	$ -	$ 3,000
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-	500	500	500	500	500	500		3,000
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ 500	$ 500	$ 500	$ 500	$ 500	$ 500	$ -	$ 3,000

(000)	FY 2016-17	FY 2017-18	PROJECTED FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$500	$500	$500	$500	$500	$500	$0	$3,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA
Great Lakes Water Authority

Project Title	**Collection System Backwater Gates and Regulator Gates Rehabilitation (CIP 1357)**
Project Significance	Replacement of CSO outfall back water gates is essential to prevent the river inflow into the collection system. Many are missing and the rest of them have reached their life expectancy.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** O&M Request

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	CSO Outfall Backwater Gates
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Design Build
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Outfall with 2 closed gates

Include caption for the map. Map is especially important for linear assets.

Problem Statement	There are over 80 CSO outfalls in the GLWA collection system to relieve the excess combined sewage into the receiving waters during wet weather events. When the CSO outfalls are below the river elevation, the river must be prevented from flowing into the outfalls and eventually flowing into the wastewater treatment plant. To prevent this from happening there are backwater gates at the discharge side of the CSO outfalls. These backwater gates are timber gates that serve dual purposes; prevent river inflow into the collection system; enable the excess combined sewage outflow from the collection system into the receiving waters. Some of these gates are missing and most of the existing ones have reached their life expectancy. To prevent the river inflow the missing ones have to be installed and the existing outdated ones have to be replaced.
History / Background	The installation of these structures are dated back to 1912 under various contracts. All back water gates were replaced in the late seventies and again 6 were replaced in the recent years under PC-698. Existing ones are past their service life.
Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Locate the CSO Outfall back water gates, evaluate the existing conditions, and provide the necessary replacement / rehabilitation to minimize the river inflow into the collection system.

Related projects currently underway or planned	PC-698
Potential Challenges	Some outfalls are below the river elevation; installation may be challenging.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	Some gates have reached their life expectancy and some are missing.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 7/29/2016 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	New	$0	$80	$0	$0	$0	$0	$0	$ 80	0.5 Yr.
Design	New	$0	$375	$0	$0	$0	$0	$0	$ 375	1 Yr.
Construction	New	$0	$846	$3,000	$3,000	$2,000	$0	$0	$8,846	2.5 Yr.
Year Totals		$ 0	$1,301	$3,000	$3,000	$2,000	$ 0	$ 0	**$9,301**	4Yr.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Project Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Do Nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	NA

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate replacement or rehabilitation required since some are missing and existing ones exceeded their service life.
2) Performance (Service Level / Reliability)	4	Likelihood of serious inconveniences and business impacts for affected customers.
3) Regulatory (Environmental / Legal)	4	Compliance failure would result in environmental impact.
4) O&M	3	Reduction in reactive maintenance activities.
5) Public Health & Safety	3	Project will have a moderate positive impact on public health and safety and environment
6) Public Benefit	4	Not implementing the project will have a chance to have a major negative public impact
7) Financial	3	Unlikely to have wide budget implication
8) Efficiency	2	Project will have little or no time and cost saving

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	4	9.60	<25% design life remaining
2) Performance (Service Level / Reliability) 15%	4	3	9.00	7% fail rate last year, so generally meets design needs
3) Regulatory (Environmental / Legal) 18%	4	1	3.60	Proximated switches are used for CSO reporting, but minimal
4) O&M 11%	3	2	4.40	Moderate to low positive impact on O&M
5) Public Health & Safety 17%	3	1	3.40	Minimal public health impact
6) Public Benefit 8%	4	3	4.80	Reducing I&I
7) Financial 10%	3	3	6.00	Potential moderate savings
8) Efficiency 9%	2	3	5.40	Moderate positive impact reducing treated water
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**46.20**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker Mini Panicker	7/29/2016
Manager	Biren Saparia Biren Saparia	7/29/2016
Chief	Cheryl Porter Cheryl Porter	7/29/2016

GLWA Water Authority

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 233001

CIP #: 1357

Project Title: **Collection System Backwater and Regulator Gates - Rehabilitation**

Contract Number:

Description: Replace Backwater Outfall gates. Prevent river inflow into the collection system

Lead Division:

Division Leader:

Project Manager: Mini Pinacker

Phone: 313-267-8996

Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 9,301

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-				$ 846	$ 3,000	$ 3,000	$ 2,000	$ -	$ -	8,846
617950	Contractual Engineering Service		-				$ 455	$ -	$ -	$ -	$ -	$ -	455
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 1,301	$ 3,000	$ 3,000	$ 2,000	$ -	$ -	$ 9,301

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-											-
Sewer Construction Bonds	-			-		-	1,301	3,000	3,000	2,000		9,301
Sewer I&E	-											-
Project Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,301	$ 3,000	$ 3,000	$ 2,000	$ -	$ -	$ 9,301

PROJECTED (000)

(000)	FY 2016-17	FY 2017-18		FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0		$0	$0	$0	$0	$0	
SDS	$0	$1,301		$3,000	$3,000	$2,000	$0	$0	$9,301

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No Date:

(circle applicable funding source): **Bond I&E** CMG

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**CIP-1381 Rehabilitation of the Screened Final Effluent (SFE) Pump Station and Secondary Water System**
Project Significance	This project is significant for two primary reasons. First, due to their condition, the SFE and Secondary Water systems require improvements (pumping systems, distribution, etc.). Second, this project will evaluate the current and potential future uses of SFE to ultimately reduce reliance on the potable drinking water system, thus being self-reliant and reducing potable water expenses. (The SFE Pump Station provides non-potable water to many of the GLWA WWTP treatment processes. Secondary water is used for fire protection and process applications such as seal water.)

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater
	Tarlochan.Bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Kenneth Singleton	Engineer	Wastewater Design	(313) 964-9248	Kenneth.Singleton@glwater.org

Site Name	GLWA WWTP
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	SFE Pump Station
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

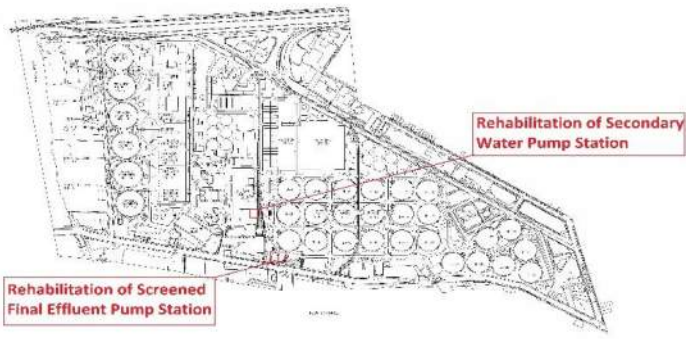


Photo Caption

Significant SFE & Secondary Water Pump Station and pipe corrosion, requiring equipment and building rehabilitation. No redundancy for power supply to SFE pump station. Latest cooling oil test (DGA) indicates potential issues with two 5kV Transformers.

Location Map of SFE and Secondary Water Pump Station at the WWTP

Problem Statement

Many of the GLWA WWTP treatment processes require screened final effluent (SFE) water. These include rack and grit, scum processing, gravity thickening, sludge dewatering, sludge incinerator scrubbers, ash silos, and the new Biosolids Drying Facility (BDF). Without SFE some processes, such as gravity thickening, can still operate for a time. However, some processes, such as the scrubbers for the incineration exhaust, cannot operate at all. A reliable source of SFE is required for the WWTP to meet air emissions requirements and to operate many of the other treatment processes.

Secondary water is also used at a number of processes. Secondary water is essentially potable water that has been isolated from the City water supply by an "air break". The "air break" prevents any possibility of back flow from the WWTP to the potable water distribution system.

Both systems need to be rehabilitated or replaced. As part of the project, all uses of SFE and secondary water need to be reviewed and evaluated for both quantity and quality requirements. The new Rouge River Outfall's (RRO) liquid chemical facility recently added 2 mgd additional load to the potable water system. The existing Chlorination & Dechlorination use 3.8 mgd average day and approximately 5 mgd max day potable water. The BDF, Chlorination & De-Chlorination and the new RRO Chemical facility are the largest users of potable water with an added significant operation cost. The evaluation should investigate to bring the SFE to sufficient quality to be carrier water for these facilities utilizing technology such as; fine strainers, filters/membrane, UV and ion exchange. The

	evaluation should identify where to minimize the use of secondary water and maximize the utilization of SFE.
History / Background	The SFE pump station has eight pumps with a total capacity of approximately 135 mgd. Pumps 1,2,4, and 6 were installed in 1973, pumps 3 and 5 in 1980, and pumps 7 and 8 in 1998. The older pumps were rebuilt in 1998. Strainers have been reconditioned as necessary over time. Due to the critical nature of the SFE pump station and the elapsed time since a major rehabilitation (over 15 years), a significant upgrade/rehabilitation is required. In addition, the two 5 kV transformers that supply power from EB-3 are approximately 40 years old and are in need of replacement. The secondary water system headworks was rehabilitated in 2006. However, due to moisture and chlorine in the room air, there has been significant corrosion of the piping, valves and other equipment. A complete rehabilitation of secondary water system headworks is required.
Preliminary Scope of Work	This project consists of two distinct scopes of work. SFE & Secondary Water Pump Station and Distribution Piping Improvements: This project will include the study, design, and construction for the needed improvements to the SFE and Secondary Water pump stations and distribution piping. It is possible that the secondary water system may need to be relocated. The option for relocation or continuing to operate in the C-I Complex will be part of the alternatives evaluation. SFE Utilization Evaluation: An evaluation and cost benefit analysis of possible additional uses of the SFE will be performed. This includes the potential need for a water treatment facility to bring the SFE to sufficient quality to be carrier water and identifying the required capacity, pumps, strainers, piping, controls, building improvements, and electrical supply associated with it. This will also include a study to evaluate the potential for replacing the secondary water utilization with SFE utilization where feasible. The distribution models for both water systems will also be updated and a redundant potable water feed to the WWTP will be evaluated. The evaluation of all alternatives will include the ability to reduce energy, potable water usage and ultimately reduce expenses.
Related projects currently underway or planned	There are no other specific projects for the SFE and Secondary Water pump stations that need to be coordinated with, however many other projects require SFE and Secondary Water and the ability to consistently supply the required quantities will need to be coordinated with these projects during construction of the improvements.
Potential Challenges	Maintaining the adequate supply of SFE and Secondary Water to the other treatment processes during construction of the SFE improvements, will be the most significant challenge on this project.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File
Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	The SFE pump station is very old and is critical to other treatment processes meeting permit requirements (e.g. incinerator air permit requirements). The Secondary Water System is corroded and needs to be rehabilitated or relocated.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 4/27/2017 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, Const. Assist.	In Proposed CIP	$0	$1700	$2000	$2000	$600	$500	$280	$7,080	6 Years
Construction	In Proposed CIP	$0	$0	$0	$10,000	$15,000	$15,779	$2141	$42,920	4 Years
Year Totals		$ 0	$1,700	$2,000	$12,000	$15,600	$16,279	$2,421	**$50,000**	6 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative
(Pick)

The alternative to a complete rehabilitation of the Pump Stations is to build a new one for each. The SFE Pump Station has a total capacity of approximately 125 mgd. A new Secondary Water headworks would cost approximately $11 M , or about 40% more than the current business case cost estimate. This CIP budget includes $14 M for the new treatment facility for SFE water reuse as a carrier water for the new RRO chemical facility and existing Chlorination & Chlorination facility instead of using DWSD potable water.

Description of Alternative Evaluation	The current business case calls for the rehabilitation of the SFE and Secondary Water PSs. A new Pump Station for each, including a building, would have a capital construction cost of at least $60M for the SFE PS and which is ripple the rehabilitation cost.
Alternative A	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Some components are passed their useful life (i.e 30-40 years)
2) Performance (Service Level / Reliability)	4	Much of the equipment is out frequently out of service.
3) Regulatory (Environmental / Legal)	5	If the SFE pump station goes down, there is an immediate risk of non-compliance for air permits.
4) O&M	4	Significant O&M is required to keep the SFE in service.
5) Public Health & Safety	5	Permit violations would cause both air quality and water quality impacts. Secondary Water is used for fire prevention.
6) Public Benefit	3	Public will benefit from improved air quality.
7) Financial	5	Exposure to multiple fines for permit violations
8) Efficiency	4	Project will have a significant impact on efficiency of other equipment by keeping them in service.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	5	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	5	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	5	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document Created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

New CIP 216006

GLWA Great Lakes Water Authority

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1381

Project Title: **Rehabilititate Screened Final Effluent (SFE) Pump Station and Secondary Water System** **Contract Number:**

Description: Many processes use non-potable water from the SFE pump station and this station needs rehabilitation to maintain the non potable water and the Secondary Water is used for Fire Suppressoin and other applications.

Lead Division: Division Leader:

Project Manager: Tarlochan Bhullar Phone: 313-297-5925 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 47,579 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 32	$ 38	$ 228	$ 297	$ 310	$ 46	$ 952
601997	Capital Allocation: Fringe Benefits	40%	-				13	15	91	119	124	18	381
601998	Capital Allocation: Nonpersonnel	5%	-				2	2	11	15	15	2	48
616900	Construction		-				$ -	$ -	$ 10,000	$ 14,640	$ 15,380	$ 2,124	42,144
617950	Contractual Engineering Service		-				$ 1,653	$ 1,945	$ 1,669	$ 530	$ 450	$ 230	6,476
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 1,700	$ 2,000	$ 12,000	$ 15,600	$ 16,279	$ 2,421	$ 50,000
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-		1,700	2,000	12,000	15,600	16,279	2,421	50,000
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 1,700	$ 2,000	$ 12,000	$ 15,600	$ 16,279	$ 2,421	$ 50,000

(000)	FY 2016-17	FY 2017-18	PROJECTED FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS			$0	$0	$0			
SDS		$1,700	$2,000	$12,000	$15,600	$16,279	$2,421	$50,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA
Great Lakes Water Authority

Project Title

Rehabilitation of Ferric Chloride Feed systems at the Pump Station – 1 and Complex B Sludge Lines (CIP 1382)

Project Significance

The Ferric Chloride Systems at PS-1 is used to reduce phosphorus to required permit levels. The systems, which include chemical storage tanks, secondary containment, valves and piping is in need of rehabilitation.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016**

Project Origin Condition Assessment

Project Manager/Sponsor	Beena Chackunkal	Engineer	Wastewater Design
	Beena.Chackunkal@glwater.org		(313) 297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Ravi Yelamanchi	Engineer	Wastewater Design	(313) 297-5965	Ravi.Yelamanchi@glwater.org

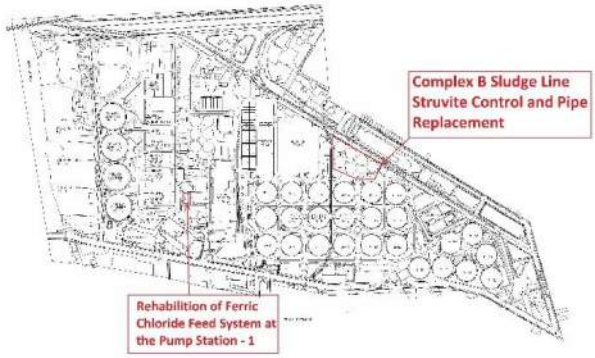
Site Name	GLWA WWTP
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Primary Treatment Ferric Chloride Feed Systems at PS-1
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Recent inspection of Ferric Chloride Tanks at Pump Station 1 found failed rubber lining and Complex B Sludge Lines clogged due to Struvite.



Location map of Ferric Chloride Feed System at PS – 1 and Complex B Sludge Lines

Problem Statement	The NPDES permit requires continuous removal of phosphorous. GLWA removes phosphorous by adding ferric chloride upstream of the primary clarifiers. The chemical storage tanks, secondary containment, piping and valves at PS-1 are approaching the end of their useful life. The system needs to be rehabilitated to continue to function properly and meet effluent permit requirements for phosphorous. There also needs to be a study to revisit the best application points for ferric chloride. Staff have notices significant struvite formation in some of the sludge lines during the replacement of valves. This struvite is the result of phosphorous, magnesium, and ammonia nitrogen crystallization in the pipelines. The buildup of struvite reduces the cross sectional area of the pipe and eventually can lead to full blockage. This will require the sludge lines to be replaced from Complex B.
History / Background	There are phosphorous effluent permit limits for both primary effluent (during wet weather) and for secondary effluent. Effluent limits for phosphorous were lowered again in 2016 and now stand at 1.5 mg/l for primary effluent and 0.7 mg/l (October – March) and 0.6 mg/l (April – September) for secondary effluent. GLWA has historically been able to meet the phosphorous limits for both primary and secondary effluent by adding ferric chloride to the primary clarifier influent. The physical/chemical removal in the primary clarifiers lowered the phosphorous concentrations to meet the primary effluent limits. The biological consumption of phosphorous in the secondary system further lowered the concentrations to meet the secondary effluent limits. However, GLWA has begun to experience some difficulty with the settling of the secondary biomass in the final clarifiers.

	Preliminary investigations have indicated that this settling ability issue could be caused by low phosphorous concentrations in the secondary influent wastewater. This is because the biomass in the secondary system requires a certain ratio of carbon (CBOD), nitrogen, and phosphorous to reduce the pollutant concentrations and then settle in the final clarifiers. As such, in addition to rehabilitating the ferric chloride system at PS-1, there also needs to be a study and possibly pilot test conducted to review the best location for ferric chloride addition to the wastewater.
Preliminary Scope of Work	The scope of work will include study design and construction for the ferric chloride feed system at PS-1. Specifically it will include: a study to evaluate alternative locations for application of ferric chloride, a pilot study to test alternative application points, and inspection of the existing chemical feed systems, a study to provide recommendations for system modifications and improvements, design of recommended system improvements, and construction of chemical feed system improvements.
Related projects currently underway or planned	Under small capital project, rehabilitation of Pump Station – 2 Ferric Chloride Feed System is currently in design stage and construction will start in fall 2016.
Potential Challenges	Maintaining capacity of the existing feed system during construction will be a challenge. Also, determining the simplest system that will meet current and future phosphorous limits for both primary and secondary effluent will be a challenge.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	The current chemical feed systems at PS-1 has deteriorated to the point where this need to be rehabilitated.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.
Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.
Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.
Salvage Value: The estimated value of an asset at the end of its useful life.
Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/27/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, & Const. Assist.	New	$0	$400	$400	$200	$0	$0	$0	$1,000	3 Year
Construction	New	$0	$0	$1000	$5000	$2000	$633	$0	$8,633	4 Year
Year Totals		$ 0	$ 400	$1,400	$5,200	$2,000	$ 633	$ 0	**$9,633**	5 Years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	**Replace with upgrade**
Description of Alternative Evaluation	The alternative to rehabilitating the existing ferric feed systems is to replace in kind with new as well as to build the new struvite control facility. The capital construction cost for this is estimated to be significantly higher than the rehabilitation alternative.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Condition was identified as poor over three years ago
2) Performance (Service Level / Reliability)	4	High risk of failure. Only one chemical tank at PS-1 is available.
3) Regulatory (Environmental / Legal)	5	Imminent risk of causing phosphorous permit violation.
4) O&M	4	High level of O&M required.
5) Public Health & Safety	3	Phosphorous is a long term issue and not an acute pollution issue.
6) Public Benefit	4	GLWA is viewed as a leader in phosphorous removal. High public perception.
7) Financial	4	High probability for permit violations and subsequent fines.
8) Efficiency	4	This could lead to a sustainable "green" effort in phosphorous recovery.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	4	9.60	<25% design life remaining
2) Performance (Service Level / Reliability) 15%	4	4	12.00	Not performing as expected; project has significant impact on service level
3) Regulatory (Environmental / Legal) 18%	5	3	10.80	Moderate risk if there was a failure
4) O&M 11%	4	3	6.60	Moderate levels of O&M required currently
5) Public Health & Safety 17%	3	1	3.40	Minimal public health impact
6) Public Benefit 8%	4	2	3.20	Low to moderate
7) Financial 10%	4	3	6.00	Some cost savings by upgrade, $250K-$1M
8) Efficiency 9%	4	3	5.40	Increase efficiency in Ferric Chloride dosing
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**57.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 211008

CIP #: 1382

Project Title: **Rehabilitate Ferric Chloride System** Contract Number:

Description: Rehabilitate storage tanks, retention area, valves, pipes and entire system. Used to reduce phosphorus to regulatory levels.

Lead Division: Division Leader:

Project Manager: Tarlochan Bhullar Phone: 313-297-5925 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 9,633 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -		$ 50	$ 186	$ 72	$ 23	$ -	$ 331
601997	Capital Allocation: Fringe Benefits	40%	-					20	74	29	9	-	132
601998	Capital Allocation: Nonpersonnel	5%	-					3	9	4	1	-	17
616900	Construction		-				$ -	$ 927	$ 4,730	$ 1,896	$ 600	$ -	8,153
617950	Contractual Engineering Service		-				$ 400	$ 400	$ 200	$ -	$ -	$ -	1,000
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 400	$ 1,400	$ 5,200	$ 2,000	$ 633	$ -	$ 9,633
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-			-	400	1,400	5,200	2,000	633		9,633
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 400	$ 1,400	$ 5,200	$ 2,000	$ 633	$ -	$ 9,633

PROJECTED (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$400	$1,400	$5,200	$2,000	$633	$0	$9,633

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA
Great Lakes Water Authority

Project Title	**Rehabilitation of the Wet and Dry Ash Handling Systems (CIP 1383)**
Project Significance	The ash systems convey and store ash for ultimate disposal. The incinerators cannot be used if both the systems are not working.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater Design
	tarlochan.bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Alfredo Lava	Engineer	Wastewater Design	(313) 297-5940	alfredo.lava@glwater.org

Site Name	GLWA WWTP
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Incinerator Complex II Ash Handling Systems Rehabilitation and Complex I decommissioning and reconfiguration
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

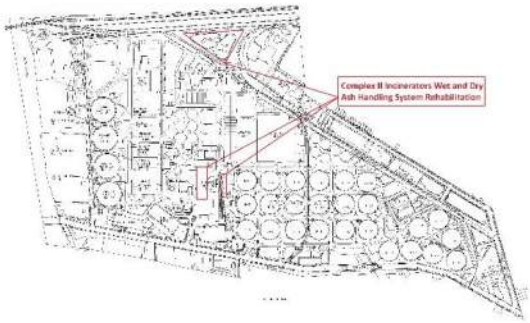


Photo Caption

Ash crusher system was last rehabilitated 15 years ago and near the end of its useful life, due to Complex I decommissioning dry ash system needs to be reconfigured and rehabilitated

Project work will include the rehabilitation of the wet and dry ash systems at Complex II Incinerators, including the piping, valves, isolation gates, vacuum pumps, air filters, HVAC, boilers, silo repairs, site work and drainage, and structural repairs. The wets ash system rehabilitation will include the pumps, piping, and sluicing system.

Problem Statement	Even though the Complex-I Incinerators are planned to be decommissioned, the Complex-II Incinerators are a critical component in processing biosolids. The incinerators cannot be used if the ash handling systems are not in operation. The wet ash system has been out of operation for over five years and the dry ash system is approaching the end of its useful life. In order to take out the dry ash system and completely rehabilitate it, it would be a good approach to rehabilitate the wet ash system first. This will provide redundancy for the long term as well.
History / Background	The C-I and C-II Incinerators have been the primary source for processing biosolids at the GLWA WWTP since the plant was first built. The original ash handling system was a wet ash/sluicing process. The dry ash system was constructed in the 1960s and expanded with the construction of the C-II Incinerators in the 1970s. The wet ash system has not been in use for over five years and there is no backup if the dry ash system goes down. The C-I Incinerators are planned to be decommissioned in the next year or two and there is a potential to link the C-I ash handling system to the C-II system to provide extra storage.
Preliminary Scope of Work	This scope of work will include study, design, and construction for the rehabilitation of the wet and dry ash systems. The scope will also include the piping, valves, isolation gates, vacuum pumps, air filters, HVAC, boilers, miscellaneous silo repairs (concrete, access, etc.) site work and drainage, and miscellaneous structural repairs (foot bridge, spalling concrete, etc.) at the dry ash handling system. It will also include the pumps, piping, and sluicing system at the wet ash system.

Related projects currently underway or planned	This project should be coordinated with the decommissioning of the C-I Incinerators as well as any planned plant wide pipe rehabilitation program.
Potential Challenges	Maintaining the dry ash system at capacity while the wet ash system is being built will be a challenge.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	The wet ash system has been out of service for over five years and the dry ash system is nearing the end of its useful life.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate	7/27/2016	**Prepared By**	Wastewater Design Group	**Division**	Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, & CA	New	$0	$530	$1045	$225	$225	$125	$0	$2,150	5 Year
Construction	New	$0	$0	$0	$6000	$5500	$4666	$0	$16,166	3 Year
Year Totals		$ 0	$ 530	$1,045	$6,225	$5,725	$4,791	$ 0	**$18,316**	5 Year

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative to rehabilitation is to demolish the old systems and build new ones. The capital construction cost for demolition and new construction is approximately $50 M which is more than triple the rehabilitation cost.
Description of Alternative Evaluation	The current business case calls for a rehabilitation of the wet and dry ash systems. The system includes pumps, (centrifugal and vacuum), piping, ash silos (including storage and loading facilities) I&C, and electrical components.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	The wet ash system is inactive and the dry ash system is at the end of its useful life.
2) Performance (Service Level / Reliability)	4	High risk of performance failure due to age and no backup.
3) Regulatory (Environmental / Legal)	4	If incinerators go down, there is little additional capacity to process all of the sludge.
4) O&M	4	High degree of O&M required.
5) Public Health & Safety	4	Will create a much better work environment for staff as well as minimize air quality issues perceived off site.
6) Public Benefit	4	Impact on public can be high by controlling air quality.
7) Financial	4	Biosolids could backup if incinerators go down. This has historically resulted in permit violations.
8) Efficiency	4	Old system is very inefficient. New pumps, vacuums, and filters will be more efficient.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	4	9.60	<25% service life remaining
2) Performance (Service Level / Reliability) 15%	4	3	9.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	4	3	10.80	MIOSHA violation from loose ash inhalation hazard
4) O&M 11%	4	4	8.80	High level of O&M required currently
5) Public Health & Safety 17%	4	3	10.20	If different from PM Score.
6) Public Benefit 8%	4	1	1.60	Minimal public benefit
7) Financial 10%	4	1	2.00	No significant impact
8) Efficiency 9%	4	1	1.80	No significant impact
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**53.80**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document Created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	7/27/2016
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213008

CIP #: 1383

Project Title: **Rehabilitation of the Ash Handling Systems** **Contract Number:**

Description: Ash system convey ash from incinerators for disposal. Must have both systems working to run incinerators.

Lead Division: Division Leader:

Project Manager: Tarlochan Bhullar Phone: 313-297-5925 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 18,316 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 1	$ 3	$ 18	$ 16	$ 14	$ -	$ 52
601997	Capital Allocation: Fringe Benefits	40%	-				1	1	7	6	5	-	21
601998	Capital Allocation: Nonpersonnel	5%	-				0	0	1	1	1	-	3
616900	Construction		-				$ -	$ -	$ 5,975	$ 5,477	$ 4,646	$ -	16,097
617950	Contractual Engineering Service		-				$ 528	$ 1,041	$ 225	$ 225	$ 125	$ -	2,144
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 530	$ 1,045	$ 6,225	$ 5,725	$ 4,791	$ -	$ 18,316

Funding Source(s)

Water Construction Bonds		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E		-											-
Sewer Construction Bonds		-			-	-	530	1,045	6,225	5,725	4,791	-	18,316
Sewer I&E		-											-
	Project Total	$ -	$ -	$ -	$ -	$ -	$ 530	$ 1,045	$ 6,225	$ 5,725	$ 4,791	$ -	$ 18,316

(000)	FY 2016-17	FY 2017-18	PROJECTED FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$530	$1,045	$6,225	$5,725	$4,791	$0	$18,316

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

GLWA
Great Lakes Water Authority

Project Title	**CIP-1384 Rehabilitation of Combined Sewer Overflow (CSO) Retention Treatment Basins (RTB), Screening and Disinfection Facilities (SDF)**
Project Significance	The rehabilitation and adequate operation of these permitted CSO facilities are vital to maintain NPDES permit compliance.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **4/12/2017** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater Design
	Tarlochan.Bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Gary Stoll	Engineer	Wastewater Design	(313) 297-6402	Gary.Stoll@glwater.org

Site Name	Conner Creek, Seven Mile, Puritan-Fenkell, Hubble-Southfield, Belle Isle, Oakwood CSO Basins, Baby Creek, Leib and St. Aubin Screening and Disinfection Facilities
If Facility, Facility Address	Multiple locations
Service Area	Wastewater Operating Services
Project Category	CSO Facilities
Project Type	Study, Design and Construction
Primary Focus	CSO RTB and SDF facilities
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Retrofitted chemical feed pump replacement at Puritan-Fenkell RTB and makeshift wooden stairs to enter Basin Valve Gallary

Various CSO RTB and SDF facilities map

Problem Statement

GLWA's CSO RTB and SDF's identified for rehabilitation in this project were placed in service over the past 17 years, and majority of the CSO RTB and SDF facilities are over 10 years old. The proposed new CIP#1384 budget from FY-2018 thru FY-2022 is $28.45M for rehabilitation of all GLWA's CSO RTB and SDF facilities. The CIP budget for ongoing emergency repair work at Conner Creek CSO Basin for FY-2017 is $1.34M. DWSD owned Belle Isle CSO Facility CIP budget $200K is not included in this CIP. DWSD was notified via email for the future CIP planning. This CIP#1384 budget is in addition to the previous CIP# 1313 budget amount $7.25M, which is currently being utilized to perform ongoing emergency repair work at Conner Creek CSO Basin and Conner Pump Station. The ongoing FY-2017 projects at Conner Creek CSO Basin with total budget $1.34M are construction project Chemical Feed System Rehabilitation CON-144 ($1.63M), I&C Automation & Upgrade CS-172 ($92K), 5 Accusonic Meter Repairs CS-145 ($167K), Emergency Relief Gate & Power and Controls Raceway CS-116 ($310K) and Construction of Access Hatches DWS-065 ($390K). At the CSO Facilities chemical feed pumps and valves are failing frequently, chemical tanks needs to be inspected and rehabilitated, chemical mixing system needs to be evaluated and rehabilitated. Generally the chemical feed system pumps, valves and gates are operated in local modes or manually. Due to the reduced staffing level, operational staff finds it difficult to operate these CSO facilities. In order to be in compliance of the NPDES permit these facilities needs to be rehabilitated and automated and to be operated effectively and efficiently from the facility control room. In addition some preliminary investigations have also noted some miscellaneous deficiencies at some basins including gates, sump pumps, dewatering pumps, structural defects, effluent weirs and launders. This project will rehabilitate or replace the difficult to maintain valves, gates, actuators, chemical feed pumps, mixers, dewatering pumps, sampling pumps and other miscellaneous deficiencies at the following CSO RTB and SDF's facilities;

- Puritan-Fenkell
- Conner Creek
- Seven Mile
- Hubbell Southfield

	• Oakwood • St. Aubin & Leib • Baby Creek • Bell Isle In addition to the repairs at all of the facilities, there are several major issues that need to be addressed at the Conner Creek basin. This includes an investigation into the cause of recent local area flooding. It is believed that the failure of the effluent gated to open may have contributed to the flooding and as such these need to be evaluated and a solution identified and designed. At the Conner Creek basin facility due to recent rain events emergency repair activities are ongoing to replace/repair equipment critical to operation.
History / Background	GLWA's CSO RTB and SDF's were designed and constructed over the 17 years period starting with Puritan-Fenkell and Seven Mile CSO RTB placed in service year 1999, Hubbell-Southfield RTB year 2000, Leib and St. Aubin CSO SDF's year 2002, Conner Creek RTB year 2005, Baby Creek SDF 2006, Belle Isle RTB year 2008, and Oakwood RTB 2013. Different type of CSO control treatment system, technology and equipment were selected during the pilot phase in order to meet the mandated NPDES permit requirements by MDEQ. GLWA wastewater operational staff have identified the operation and maintenance deficiencies in treatment system, equipment and technology. This much needed rehabilitation project can be utilized as an opportunity to meet operational staff needs.
Preliminary Scope of Work	This project will include study, rehabilitation design and standardization of the existing chemical feed pumps, valves, recirculation pumps, mixers, rehabilitation of chemical tanks and pipes. The scope will include Instrumentation & Control (I&C) upgrade to standardize hardware and software, automation of the CSO RTB and SDF facilities to be operated from each facility control room. This project will also include rehabilitation or replacement of difficult to maintain equipment such as valves, gates, actuators, dewatering pumps, sampling pumps etc. The other facility upgrades includes testing and upgrades to gas detection, security and fire alarm system. The building upgrades will include roof repair or replacement, windows doors replacement, HVAC and odor control systems. The study and design will include evaluation of high efficiency equipment and ability of alternatives to reduce chemical and energy costs. At the Conner Creek CSO RTB facility due to recent rain events emergency repair activities are ongoing to repair equipment critical to RTB operation. The emergency repair includes only operation critical rehabilitation needs to avoid flooding's, the remaining non critical rehabilitation needs identified in the Needs Assessment Report will be addressed through this proposed project at this facility.
Related projects currently underway or planned	The proposed new CIP budget for rehabilitation for all the CSO RTB and SDF facilities is based on the 2016 Needs Assessment Study Report and condition assessment performed under CS-1499, Task 18. The condition assessment identified deficient process equipment, systems and deteriorating structural conditions that required near-term remedial work at the three RTB's: the Puritan-Fenkell Basin and dry weather pump station (completed in 1998 under PC-697), the Seven Mile (Completed in 1999 under PC-696) and the Conner Creek (completed in 2005 under PC-739). The 2016 Needs Assessment Facility

	walkthrough have identified that CSO RTB and SDF's at Hubbell Southfield, St. Aubin & Leib, Baby Creek and Bell Isle needs rehabilitation. The Puritan-Fenkell and Seven Mile RTB's will be combined with this new capital improvements plan for all the remaining CSO facilities. GLWA staff have identified that Conner Creek CSO facility rehabilitation is critical to the wastewater operation and few projects has initiated as an emergency repair work. Due to recent rain events under emergency repair activities the following scope items at GLWA's Conner Creek CSO RTB are ongoing; Install additional automation, continue repairs to existing automation, replace five sodium hypochlorite pumps, repair piping leaks and relocate piping for the flushing water system, replace 5 Accusonic meters upstream, replace electrical power and controls raceway above the RTB, replace emergency relief gates causing concrete damage, replace all disinfection valves, replace all insulation and heat taping for exposed sodium hypochlorite lines, replace all sodium hypochlorite mixers in the channels. The above Conner Creek CSO RTB facility emergency repair list include only operation critical rehabilitation needs to avoid flooding's, the remaining non critical rehabilitation needs identified in the Needs Assessment Report will be addressed through this proposed project at this facility.
Potential Challenges	Maintaining the adequate CSO treatment processes capacity during construction of the CSO RTB and SDF's improvements, will be the most significant challenge on this project.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	The chemical feed system pumps, valves, gates, dewatering and sampling pumps are old and critical to the CSO RTB and SDF treatment processes meeting permit requirements. Some equipment is longer supported by manufacturing vendors and parts are no longer available in the market. In the past notice of violation were issued by MDEQ due to equipment out of service for longer period and were addressed by GLWA maintenance staff retrofitting other available equipment.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/27/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design and Const. Assist.	In Proposed CIP	$0	$1000	$1400	$1000	$200	$100	$0	$3,700	5 Year
Construction	In Proposed CIP	$0	$0	$5,000	$8,000	$7000	$3510	$0	$23,510	4 Years
Const. CON-144	In Proposed CIP	$500	$1137	$0	$0	$0	$0	$0	$1,637	1 Years

Design CS-145	In Proposed CIP	$167	$0	$0	$0	$0	$0	$0	$ 167	1 Years
Study Design CS-172	In Proposed CIP	$92	$0	$0	$0	$0	$0	$0	$ 92	1 Years
Study Design CS-116	In Proposed CIP	$200	$110	$0	$0	$0	$0	$0	$ 310	2 Years
Const. DWS-065	In Proposed CIP	$390	$0	$0	$0	$0	$0	$0	$ 390	1 Years
Year Totals		$1,349	$2,247	$6,400	$9,000	$7,200	$3,610	$ 0	**$29,806**	5 Years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Alternate to rehabilitation of existing sodium hypochlorite chemical feed system will be retrofitting new UV disinfection system or use new alternative disinfection chemical Peracetic Acid (PAA)
Description of Alternative Evaluation	Both alternative will be expensive, retrofitting UV system will require a large capital cost, Alternative B provides the planning level capital cost estimate for UV system at the existing CSO RTB and SDF facilities.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Some equipment have passed useful life over 10 years
2) Performance (Service Level / Reliability)	4	Much of the equipment is frequently out of service
3) Regulatory (Environmental / Legal)	5	If the CSO RTB and SDF equipment goes down, there is an immediate risk of non-compliance for NPDES permits.
4) O&M	4	Significant O&M is required to keep the CSO RTB and SDF in service.
5) Public Health & Safety	4	NPDES permit violations would cause water quality impacts.
6) Public Benefit	3	Public will benefit from improved water quality in local receiving water bodies.
7) Financial	4	Exposure to multiple fines for permit violations
8) Efficiency	4	Rehabilitation will provide automation and will result in increased efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	5	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	4	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	4	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	3	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	4	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 215001

CIP #: 1384

Project Title: **Rehabilitate combined Sewer Overflow (CSO) Retention Treatment Basin (RTB) Screening Replaces CIP 1313**

Contract Number:

Description: Rehabilitate 9 CSO facilities to operate properly and to comply with NPDES permits.

Lead Division:

Division Leader:

Project Manager: Tarlochan Bhullar

Phone: 313-297-5925

Department Charged: Water X Sewage Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 28,457

Estimated Start Date *:

Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 22	$ 62	$ 87	$ 70	$ 35	$ -	$ 276
601997	Capital Allocation: Fringe Benefits	40%	-				9	25	35	28	14	-	110
601998	Capital Allocation: Nonpersonnel	5%	-				1	3	4	3	2	-	14
616900	Construction		-			3,520	$ 999	$ 5,667	$ 7,970	$ 6,376	$ 3,197	$ -	27,730
617950	Contractual Engineering Service		-				$ 1,216	$ 643	$ 903	$ 723	$ 362	$ -	3,847
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ 3,520	$ 2,247	$ 6,400	$ 9,000	$ 7,200	$ 3,610	$ -	$ 31,977
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-	3,520	2,247	6,400	9,000	7,200	3,610		31,977
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ 3,520	$ 2,247	$ 6,400	$ 9,000	$ 7,200	$ 3,610	$ -	$ 31,977

(000)	PROJECTED FY 2016-17	FY 2017-18	FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$3,520	$2,247	$6,400	$9,000	$7,200	$3,610	$0	$31,977

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:

Finance Manager

Accounting Approval: Date:

Accounting Manager/ General Ledger

Authorization to Proceed: Date:

Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 6, 2017

New CIP 212007

Project Title	**Rehabilitation of the Secondary Clarifiers (CIP 1385)**
Project Significance	The secondary clarifiers need to be inspected and rehabilitated for certain components such as the rake arms.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Beena Chackunkal	Engineer	Wastewater Design
	Beena.Chackunkal@glwater.org		(313) 297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Kenneth Singleton	Engineer	Wastewater	(313) 297-9826	Kenneth.Singleton@glwater.org

Site Name	GLWA WWTP
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Secondary Clarifiers System
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

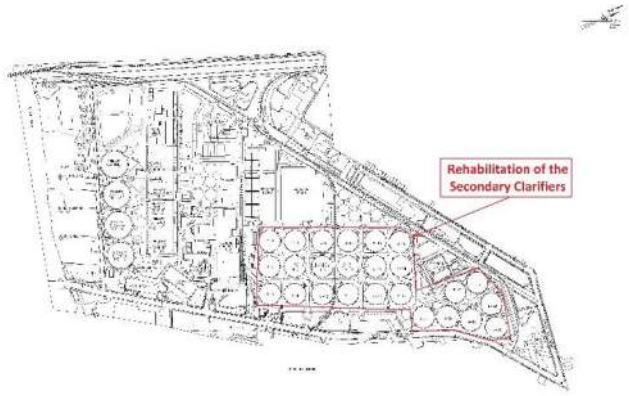


Photo Caption

Only one or maximum two out of total 25 secondary clarifiers can be taken out of service at a time for repairs. Secondary system has a lot of moving parts and equipment. A long term (8 years) rehabilitation program for the secondary clarifiers needs to be initiated.

Secondary clarifiers layout

Problem Statement	The secondary clarifiers require rehabilitation. The center drives need to be refurbished, the concrete needs to be inspected, and the clarifiers need isolation gates installed. Other miscellaneous rehabilitation for smaller components also needs to be completed.
History / Background	There are 25 secondary clarifiers at the GLWA WWTP. They have been rehabilitated in the past for other components such as RAS pumps, troughs and weirs, and center drives. It is time to refurbish some of the other key components.
Preliminary Scope of Work	This project will provide for inspection, study, design, and construction for refurbishing the secondary clarifiers. A key component will be the inspection of the concrete and the rake arms. Once the condition of these components is determined, alternatives will be evaluated and the selected alternative will be designed and constructed. The scope will also include evaluating and designing isolation gates for the individual clarifiers. The B Houses have energyintensive HVAC units. These will be evaluated for potential payback with alternative, energy efficient units.
Related projects currently underway or planned	This project should be coordinated with the recently completed upgrades to finalize a list of components that were not previously upgraded.

Potential Challenges	This will be a long term project because only one or two clarifiers can be taken out of service at a time. Also, there may be different levels of rehabilitation for each clarifier depending upon the results of the inspection.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	Some of the key components are approaching the end of their useful life.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/27/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, Const. Assist.	New	$0	$301	$576	$543	$540	$540	$1499	$3,999	8 Year
Construction	New	$0	$0	$3000	$5000	$5000	$5000	$9000	$27,000	7 year
Year Totals		$ 0	$ 301	$3,576	$5,543	$5,540	$5,540	$10,499	**$30,999**	8 Years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative would be to build new secondary clarifiers.
Description of Alternative Evaluation	The current business case calls for the rehabilitation of the secondary clarifiers. The alternative to build 25 new secondary clarifiers would cost approximately $500M. This is approximately 20 times the cost of the rehabilitation alternative.

Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Some equipment has begun to fail.
2) Performance (Service Level / Reliability)	3	Clarifiers are still performing reasonably well.
3) Regulatory (Environmental / Legal)	3	Some impact on potential permit issues.
4) O&M	3	Some O&M is required to keep in service
5) Public Health & Safety	3	Potential to impact public health
6) Public Benefit	3	Some benefit to public
7) Financial	3	Moderate financial impact
8) Efficiency	3	Some improvement in efficiency
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	3	7.20	50% useful life left
2) Performance (Service Level / Reliability) 15%	3	3	9.00	A couple are out of service sometimes
3) Regulatory (Environmental / Legal) 18%	3	3	10.80	Firm capacity issues
4) O&M 11%	3	3	6.60	Some O&M required to keep in service
5) Public Health & Safety 17%	3	1	3.40	Minimal public health impact
6) Public Benefit 8%	3	0	0.00	No measurable public benefit
7) Financial 10%	3	1	2.00	Minimal impact
8) Efficiency 9%	3	1	1.80	No significant impact
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**40.80**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA Great Lakes Water Authority

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 212007

CIP #: 1385

Project Title: **Rehabilitiation of Secondary Clarifiers** **Contract Number:**

Description: Must inspect and rehabilitate the secondary clarifier components. Rake arms and more.

Lead Division: Division Leader:

Project Manager: Beena Chackunkal Phone: 313-297-9825 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-22 FY $ 20,500 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	$ 1	$ 16	$ 25	$ 25	$ 25	$ 48	$ 141
601997	Capital Allocation: Fringe Benefits	40%	-				1	6	10	10	10	19	56
601998	Capital Allocation: Nonpersonnel	5%	-				0	1	1	1	1	2	7
616900	Construction		-				$ 25	$ 2,976	$ 4,964	$ 4,964	$ 4,963	$ 8,931	26,823
617950	Contractual Engineering Service		-				$ 274	$ 576	$ 543	$ 540	$ 541	$ 1,499	3,973
Jill: Need GL Code	Materials		-				$ -	$ -	$ -	$ -	$ -	$ -	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	$ 301	$ 3,576	$ 5,543	$ 5,540	$ 5,540	$ 10,499	$ 30,999
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-		-	-	301	3,576	5,543	5,540	5,540	10,499	30,999
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 301	$ 3,576	$ 5,543	$ 5,540	$ 5,540	$ 10,499	$ 30,999

(000)	FY 2016-17	FY 2017-18	PROJECTED FY 2018-19	(000) FY 2019-20	FY 2020-21	2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$301	$3,576	$5,543	$5,540	$5,540	$10,499	$30,999

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: **Cost Center** **Object No.** **WSS Project No.:** 0

S Fund No: **Cost Center** **Object No.** **SDS Project No.:** 0

Revised: April 5, 2017

GLWA
Great Lakes Water Authority

Project Title	**Rehabilitation of the Circular Primary Clarifier Scum Removal System (CIP 1386)**
Project Significance	The circular clarifiers scum removal system is over 10 years old and need to be rehabilitated. They will help protect the secondary treatment process by preventing scum from entering the aeration tanks.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater Design
	Tarlochan.Bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Kenneth Singleton	Engineer	Wastewater Design	(313) 297-9826	kenneth.singleton@glwater.org

Site Name	GLWA WWTP
If Facility, Facility Address	930 West Jefferson Avenue, Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Wastewater Circular Primary Clarifiers
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

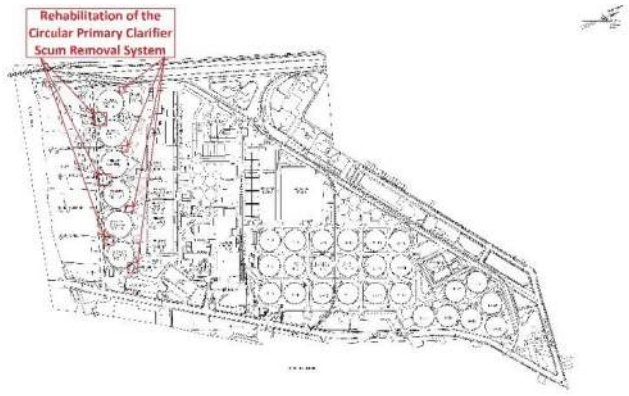


Photo Caption

The existing scum system is complicated to operate and difficult to maintain, equipment remains out of service for extended period. The scum beaches needs better enclosure and heating system, during extreme cold conditions scum collection system get frozen.

Layout map of the circular primary scum removal system facilities

Problem Statement	The circular primary clarifier (PC) scum buildings (SBs) have complicated and old equipment. There have been numerous problems including pump failure, pipe clogging, and rupture disk failure. All of these issues cause the scum removal process to be shut down. When this equipment is out of service, the scum builds up on the clarifier surface and can eventually wash over the weirs and into the secondary aeration basins. This causes multiple problems including foaming, lower oxygen transfer, and scum buildup. Once the scum enters the aeration tanks it is difficult to remove because the aeration tanks have submerged weirs. This project will address the equipment inside the SBs greatly improve the work environment for staff.
History / Background	There are 12 rectangular PCs (1-12) and 6 circular PCs (13-18) at the GLWA WWTP. PCs remove TSS, BOD, and phosphorous through a chemically enhanced settling process. The clarifiers also remove fats, oils, and grease (FOG or scum) by skimming the surface of the clarifiers and transporting the scum to a SB where it can be concentrated and pumped again to be hauled off site. The SBs for the rectangular clarifiers were recently rehabilitated. They have a fairly simple system and appear to be operating well. There are seven SBs (8-14) for the circular clarifiers and they utilize a somewhat complex transport and concentration system. New SBs were installed for PCs 17 and 18 when they were constructed. Since there installation, the equipment in the circular clarifier SBs has been complicated to operate and difficult to maintain. Much of the equipment is out of service for extended periods of time.

Preliminary Scope of Work	This project will provide for the study, design and construction of new scum equipment in the circular clarifier SBs (8-14). The study will consist of an evaluation of the existing process which consists of: chains and flights to lift the scum into the SBs; the scum is deposited into a holding tank where it is then pumped to a scum concentrator; the concentrated scum is dropped into a holding tank; the scum from the holding tank is then pumped again to a dumpster for hauling off site. All of these steps make for a complicated and messy operation and more equipment than is necessary. This results in more equipment failure and overall scum removal system down time. The study will evaluate simplified alternative systems for scum removal including the scum removal from the buildings. Future alternatives for scum disposal, such as addition to an anaerobic digestion process, will be considered. All alternatives will be evaluated for energy efficiency (reduction of electrical usage). The scum removal system at the rectangular PCs will also be evaluated to determine which aspects can be applied to the circular SBs. The final scope of work could also include some additional improvements such as handrails at PCs 13 and 14. Design and construction services will be included for the selected scum removal system.
Related projects currently underway or planned	This project will need to be closely coordinated with other ongoing PC rehabilitation projects. Especially PC-757 which will be limiting primary capacity due to taking multiple primary clarifiers out of service for rehabilitation.
Potential Challenges	Each of the scum removal facility serves two circular clarifiers, so two circular clarifiers at a given time needs to be out of services during rehabilitation, this will limit the primary capacity to minimum to meet NPDES permit requirements. This will require all the rectangular and remaining circular clarifiers in-service. No other capacity reduction construction activity in the primary system can happen during the execution of this project.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	The condition of the existing equipment is old and complicated, this results in significant down time and maintenance challenges.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/27/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, & Const. Assist.	New	$0	$266	$324	$370	$171	$170	$179	$1,480	6 Year
Construction	New	$0	$0	$0	$1500	$2500	$2500	$2500	$9,000	4 Year
Year Totals		$ 0	$ 266	$ 324	$1,870	$2,671	$2,670	$2,679	**$10,480**	6 Year

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative would be to demolish the existing multiple scum removal facilities for the circular primary clarifiers and have a consolidated scum building similar to the rectangular primary clarifiers scum removal system.
Description of Alternative Evaluation	The current business case calls for the rehabilitation of the Existing Scum Building at the Circular Primary Clarifiers. The capital construction cost estimate for this alternative to demolish the existing multiple scum removal buildings and have a consolidated scum building is approximately $18M (including new buildings and equipment). This is more than double the cost for the rehabilitation alternative.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Equipment consistently out of service
2) Performance (Service Level / Reliability)	4	Equipment is very difficult to maintain.
3) Regulatory (Environmental / Legal)	3	Potential to impact the secondary treatment system and cause violations.
4) O&M	4	Complex process requires excessive maintenance.
5) Public Health & Safety	3	Scum buildings have an extremely poor work environment. This will have a significant impact on staff working conditions.
6) Public Benefit	2	Project will have minimal impact on public/customers.
7) Financial	4	Implementing project will avoid significant O&M costs.
8) Efficiency	4	Project will remove significant operational obstacles (i.e. complex system will be simplified).
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	4	9.60	Not great
2) Performance (Service Level / Reliability) 15%	4	4	12.00	Not working as intended
3) Regulatory (Environmental / Legal) 18%	3	1	3.60	No regulatory issue unless scum enters secondary tanks
4) O&M 11%	4	5	11.00	High level of O&M currently required
5) Public Health & Safety 17%	3	0	0.00	No hazards
6) Public Benefit 8%	2	0	0.00	No measurable public benefit
7) Financial 10%	4	3	6.00	Financial impact
8) Efficiency 9%	4	4	7.20	Improve efficiency in aeration basins
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**49.40**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check	Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document created.

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

New CIP 211009

GLWA

REQUEST FOR C.I.P. PROJECT NUMBER

CIP #: 1386

Project Title: **Rehabilitation of Circular Primary Clarifier Scum Removal System** Contract Number:

Description: System is 10 years old and needs rehabilitatoin to prevent scum from entering the aeration tanks

Lead Division: Division Leader:

Project Manager: Tarlochan Bhullar Phone: 313-297-5925 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 7,801 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 onward	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	2	3	17	25	25	25	97
601997	Capital Allocation: Fringe Benefits	40%	-				1	1	7	10	10	10	39
601998	Capital Allocation: Nonpersonnel	5%	-				0	0	1	1	1	1	5
616900	Construction		-						1,475	2,464	2,464	2,464	8,867
617950	Contractual Engineering Service		-				262	320	370	171	170	179	1,472
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	266	324	1,870	2,671	2,670	2,679	10,480
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-			-	-	266	324	1,870	2,671	2,670	2,679	10,480
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 266	$ 324	$ 1,870	$ 2,671	$ 2,670	$ 2,679	$ 10,480

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$266	$324	$1,870	$2,671	$2,670	$2,679	$10,480

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Finance Manager Date:

Accounting Approval: Accounting Manager/ General Ledger Date:

Authorization to Proceed: Chief Executive Officer/Chief Operating Officer Date:

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 5, 2017

GLWA
Great Lakes Water Authority

Project Title	**Wastewater System Wide Instrumentation & Controls Software and Hardware Upgrade (CIP 1388)**
Project Significance	This Instrumentation & Controls (I&C) system upgrade is for the operating system and miscellaneous ovation hardware upgrades. It is necessary when the old OS is no longer supported by Microsoft, ovation needs to be upgraded.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** Needs Assessment

Project Manager/Sponsor	Beena Chackunkal	Engineer	Wastewater Design
	Beena.Chackunkal@glwater.org		(313) 297-9825
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

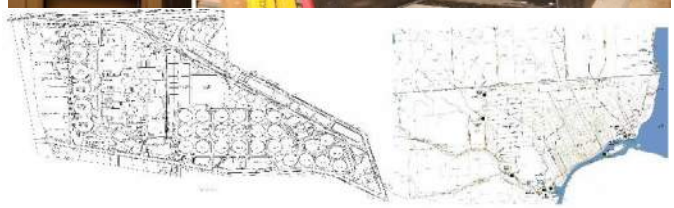
Name	Title	Division	Phone	Email
Rao Manyam	Engineer	Wastewater Design	(313) 964-9248	Rao.Manyam@glwater.org

Site Name	GLWA WWTP, Combined Sewer Overflow (CSO) Retention Treatment Basins (RTB) and Screening and Disinfection Facilities (SDF)
If Facility, Facility Address	9300 West Jefferson Ave, Detroit, MI
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	I&C System at WWTP, CSO RTB and SDF
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption
Ovation hardware and screens



GLWA Wastewater system wide upgrade

Problem Statement	I&C system needs to be upgraded when the Windows Operating System by Microsoft is no longer supported. It is anticipated that the current OS will not be supported in approximately 3 years. As such, a major I&C System upgrade will be required.
History / Background	GLWA is using an Ovation Control System. Ovation System utilizes Microsoft Windows based operating system. Anytime when Microsoft stops supporting an operating system, Ovation upgrades its software and miscellaneous hardware in order to be compatible with new windows based operating system. GLWA business practice has been not to upgrade ovation immediately and wait few years to upgrade. Prior to Microsoft plans to stop supporting the operating system.
Preliminary Scope of Work	Upgrade Ovation software and miscellaneous hardware. An evaluation for the upgrade will be conducted. During the evaluation of the upgrade, the study will also consider an evaluation of Ovation's ultimate ability to meet GLWA's future needs.
Related projects currently underway or planned	Last upgrade was completed in 2014.
Potential Challenges	Co-ordinate with Plant and CSO operation for shutdown requests during the software and hardware upgrade.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	4 - O&M
Explanation	It is necessary when the old OS is no longer supported by Microsoft, Ovation software and miscellaneous hardware needs to be upgraded.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/27/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design & Const. Assist.	New	$0	$0	$0	$0	$325	$174	$0	$ 499	2 Years
Construction	New	$0	$0	$0	$0	$2800	$2563	$0	$5,363	2 Years
Year Totals		$ 0	$ 0	$ 0	$ 0	$3,125	$2,737	$ 0	**$5,862**	2 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Replace proprietary ovation control system with other open source control hardware and software.
Description of Alternative Evaluation	This will be very expensive alternative over $200 million.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance
Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	This is related to Microsoft stop supporting their OS.
2) Performance (Service Level / Reliability)	4	Automatic operation will be compromised and equipment may go out of service.
3) Regulatory (Environmental / Legal)	5	If the equipment goes down, there is an immediate risk of non-compliance for NPDES permits.
4) O&M	5	This upgrade is O&M no-choice requirement to keep the WWTP and CSO RTB and SDF in service.
5) Public Health & Safety	3	NPDES permit violations would cause water quality impacts.
6) Public Benefit	3	Public will benefit from improved water quality in local receiving water bodies.
7) Financial	3	Exposure to multiple fines for permit violations
8) Efficiency	3	Upgrade will enhance automation and will result in increased efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	1	2.40	Recent upgrade
2) Performance (Service Level / Reliability) 15%	4	2	6.00	Performance is fair
3) Regulatory (Environmental / Legal) 18%	5	2	7.20	Low regulatory impact of failure
4) O&M 11%	5	3	6.60	Runs in auto mode
5) Public Health & Safety 17%	3	1	3.40	Minimal public health impact
6) Public Benefit 8%	3	1	1.60	Minimal public benefit
7) Financial 10%	3	2	4.00	Low financial implications
8) Efficiency 9%	3	1	1.80	Low impact
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**33.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document created

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Beena Chackunkal	8/4/2016
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA Authority Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 251002

CIP #: 1388

Project Title: **Wastewater System Wide Instrumentation & Control Software and Hardware Upgrade** Contract Number:

Description: Old software not supported by Microsoft, Upgrade software and hardware for latest Ovation controls and systems.

Lead Division: Division Leader:

Project Manager: Beena Chackunkal Phone: 313 297 9825 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 5,862 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	-	-	-	18	16	-	34
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	7	6	-	14
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	1	1	-	2
616900	Construction		-				-	-	-	2,832	2,481	-	5,313
617950	Contractual Engineering Service		-				-	-	-	267	233	-	500
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	-	-	-	3,125	2,737	-	5,862
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-			-		-		3,125	2,737	-	5,862
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,125	$ 2,737	$ -	$ 5,862

9

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$0	$0	$0	$3,125	$2,737	$0	$5,862

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Finance Manager Date:

Accounting Approval: Accounting Manager/ General Ledger Date:

Authorization to Proceed: Chief Executive Officer/Chief Operating Officer Date:

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 5, 2017

GLWA
Great Lakes Water Authority

Project Title	**Collection System In System Storage Devices(ISDs) Improvements (CIP 1391)**
Project Significance	ISDs are operational elements in the collection system that help in storing combined sewage during wet weather events to minimize the frequency and volume of the untreated overflows and to maximize the flows to the wastewater treatment plant and CSO control facilities.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/28/2016** **Project Origin** O&M Request

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.Hall@glwater.org

Site Name	In System Storage Dervices-1,2,3,4,5,6,7,8,9,10,11,12,&13
If Facility, Facility Address	Throughout Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Design Build
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.

Include caption for the map. Map is especially important for linear assets.

Problem Statement	There are 13 In-System Storage Devices (ISDs) in the GLWA collection system. ISDs are installed in the combined sewers and during wet weather they will be operated to store combined sewage to reduce the frequency and volume of combined sewer overflows. These are operational elements and their proper functioning is required to maximize the collection system capacity and in meeting the NPDES permits. Currently all 13 of them are in need of rehabilitation (ISDs #1,#2,#3,#4,#5,#6,#7,#8,#9,#10,#11,#12 and #13). Some of them are underground vaults and some are above ground structures. Underground structures infiltrate water and the dampness damaged many of the mechanical, electrical, instrumentation and control elements. No major rehabilitation has been performed since the installation. The existing condition has to be assessed for all the ISD elements and the dams should be inspected for proper functioning.
History / Background	13 ISDs were installed in the GLWA combined sewers in 2003 under PC-747. No major rehabilitation has been done since then.
Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Assess the existing conditions of the ISD elements and their structures and rehabilitate/ replace.

Related projects currently underway or planned	PC-747
Potential Challenges	These are operational elements, so flow control may be a challenge especially during wet weather periods.
Other – important project information, photos, etc. not fitting in other	Asset Numbers are -WS986810250861, WS986810250862, WS986810250863, WS986810250864, WS986810250865, WS986810250866, WS986810250867, WS986810250868, WS986810250869, WS986810250870, WS986810250871, WS986810250872,WS986810250873

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

http://sp.dwsd.org/RemoteSites/SitePages/RemoteSites.aspx?site=B001+Fox+Creek
Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	These gates have reached their life expectancy and the operating technology is outdated.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
In System Storage Devices	WS986810250861 to WS986810250873	28,838,400	Replace or Rehab

Cost Estimate Source Engineer Estimate

Date of Cost Estimate	7/27/2016	**Prepared By**	Mini Panicker	**Division**	SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	New	$0	$86	$0	$0	$0	$0	$0	$ 86	0.5 Yr
Design	New	$0	$0	$143	$0	$0	$0	$0	$ 143	1 Yr.
Construction	New	$0	$0	$321	$2,000	$1,000	$0	$0	$3,321	2.5 Yr.
Year Totals		$ 0	$ 86	$ 464	$2,000	$1,000	$ 0	$ 0	**$3,550**	4 Yrs.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Do Nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Replace or major rehabilitation needed in the short term.
2) Performance (Service Level / Reliability)	4	Equipment may be nearing obsolescence and very difficult to maintain
3) Regulatory (Environmental / Legal)	3	Moderate risk of causing unregulated discharge
4) O&M	4	Implementing the project will have a significant positive impact on O&M
5) Public Health & Safety	2	Public safety is not a major concern
6) Public Benefit	2	Project may or may not contribute to GLWA strategic plan
7) Financial	1	Minimal or no impact
8) Efficiency	3	New and better technology and time and cost savings.

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	2	4.80	15 years since last assessment, but no known failures
2) Performance (Service Level / Reliability) 15%	4	2	6.00	Fair performance, not aware of failures
3) Regulatory (Environmental / Legal) 18%	3	2	7.20	Small regulatory impact, but no non-compliance for 4-6 years
4) O&M 11%	4	1	2.20	Minimal difference in O&M
5) Public Health & Safety 17%	2	1	3.40	Minimal public health impact
6) Public Benefit 8%	2	2	3.20	Low to moderate public benefit – minimize unfishable/ unswimmable
7) Financial 10%	1	1	2.00	Minimal impact
8) Efficiency 9%	3	1	1.80	Minimal
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**30.60**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker	7/27/2016
Manager	Mini Panicker Digital signature	7/28/2016
Chief	Biren Saparia Digital signature	7/28/2016
	Cheryl Porter	

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 233002

CIP #: 1391

Project Title: **Collection Systems - In System Storage Devices** **Contract Number:**

Description: Improve the operational elements of the collection systems used to manage wet weather events and prevent / minimize untreated wastewater diverted to the surface water sources.

Lead Division: Division Leader:

Project Manager: Mini Panicker Phone: 313 267-8996 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 3,550 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	0	1	5	3	-	-	9
601997	Capital Allocation: Fringe Benefits	40%	-				0	0	2	1	-	-	4
601998	Capital Allocation: Nonpersonnel	5%	-				0	0	0	0	-	-	0
616900	Construction		-				-	319	1,992	996	-	-	3,308
617950	Contractual Engineering Service		-				86	143	-	-	-	-	229
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	86	464	2,000	1,000	-	-	3,550
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-			-	-	86	464	2,000	1,000	-	-	3,550
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ 86	$ 464	$ 2,000	$ 1,000	$ -	$ -	$ 3,550

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$86	$464	$2,000	$1,000	$0	$0	$3,550

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: **Cost Center** **Object No.** **WSS Project No.:** 0

S Fund No: **Cost Center** **Object No.** **SDS Project No.:** 0

Revised: April 7, 2017

GLWA Great Lakes Water Authority

Project Title	**Collection System Valve Remote Operation Structures Improvements (CIP 1392)**
Project Significance	VR-Gates are operational elements in the collection system that help in minimizing the untreated overflows and maximizing the flows to the wastewater treatment plant and CSO control facilities.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/28/2016** **Project Origin** O&M Request

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.Hall@glwater.org

Site Name	Valve Remote Gates-3,4,5,6,9,10,11&13
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Design Build
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

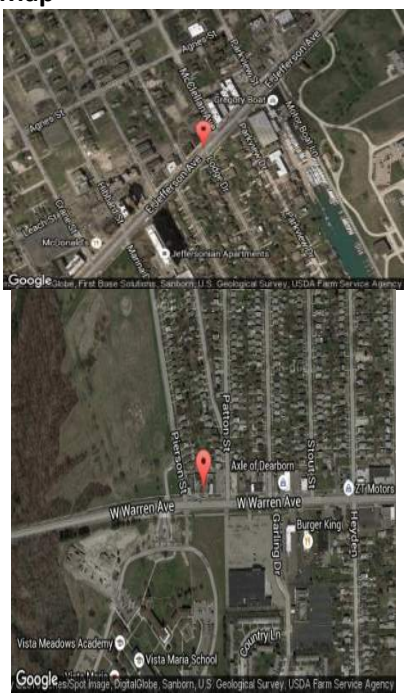


Photo Caption

VR-3

VR-9

Problem Statement	There are valve remote gates (VR-Gates) in the collection system for flow control that help in minimizing the untreated overflows and maximizing the flows to the wastewater plant and CSO control facilities. These are operational elements and their proper functioning is required in meeting the NPDES permits. Currently there are eight valve remote gates (VR#3, VR#4, VR#5,VR#6, VR#9,VR#10,VR#11,VR#13) that require improvements. These gates are operating on SCUBA units. The electrical components of the SCUBA unit controllers have reached their life expectancy and the technology is obsolete. They shall be upgraded with new electrical actuators that are more maintenance friendly.
History / Background	There are Valve Remote gates throughout the collection system that are installed in 1999 under PC-695. Most of the actuator components have reached their life expectancy and are hard to operate properly. VR-15 and VR-16 had great difficulty in controlling the flow and their SCUBA units were replaced with electrical actuators in 2016 under Small Capital Project SCP-SCC-019. Flow control is essential for the collection system flow management. These gate structures play vital roles in controlling the flow, increasing the storage capacity, and in meeting the NPDES permits.
Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Evaluate the existing conditions of the VR-Gates and their structures, provide the necessary design for the replacement of the SCUBA actuators and rehabilitation of the structures, purchase and replace.

Related projects currently underway or planned	SCP-SCC-019, PC-695
Potential Challenges	These are operational elements, so flow control may be a challenge.
Other – important project information, photos, etc. not fitting in other	Google map of VR-3 and VR-9 are included. VR-4, 5, 6, 10, 11 &13 are also part of the project.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

http://sp.dwsd.org/RemoteSites/SitePages/RemoteSites.aspx?site=B001+Fox+Creek
Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	These gates have reached their life expectancy and the operating technology is outdated.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	VR3, VR04,VR5,VR6,VR9,VR10,VR11,VR13	2,776,928	Replace

Cost Estimate Source Engineer Estimate

Date of Cost Estimate	7/22/2016	**Prepared By**	Mini Panicker	**Division**	SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	New	$0	$41	$0	$0	$0	$0	$0	$ 41	0.5 Yr
Design	New	$0	$300	$0	$0	$0	$0	$0	$ 300	0.5Yr
Construction	New	$0	$0	$1,000	$1,422	$0	$0	$0	$2,422	2 Yr.
Year Totals		$ 0	$ 341	$1,000	$1,422	$ 0	$ 0	$ 0	**$2,763**	3 Yrs.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	Do Nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	**NA**

Please describe any other alternatives evaluated:

Since the electrical elements for the control technology is obsolete there is not alternative option.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	4	Replacement needed in the short term.
2) Performance (Service Level / Reliability)	4	Equipment the controllers especially may be nearing obsolescence and very difficult to maintain.
3) Regulatory (Environmental / Legal)	3	Project will have a positive impact on uncontrolled CSO discharges and NPDES permit.
4) O&M	4	Project will have a significant positive impact on O&M.
5) Public Health & Safety	4	Likely to address hazard issues or concerns.
6) Public Benefit	4	Not implementing the project will have damage to community confidence with GLWA due to possible CSO discharges.
7) Financial	3	Decreased maintenance cost and possible reduction in the risk of fines from MDEQ.
8) Efficiency	3	Project will have significant positive impact due to the installation of a new or better technology.

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	4	4	9.60	25% service life left
2) Performance (Service Level / Reliability) 15%	4	4	12.00	Unreliable remote control; out of service 25-50% of the time
3) Regulatory (Environmental / Legal) 18%	3	3	10.80	May increase risk of noncompliance in 1-3 years
4) O&M 11%	4	5	11.00	Upgrades & remote operation, decrease O&M by 90%
5) Public Health & Safety 17%	4	3	10.20	Moderate risk
6) Public Benefit 8%	4	2	3.20	Not much impact to public
7) Financial 10%	3	3	6.00	ROI 10-15 years
8) Efficiency 9%	3	3	5.40	Upgraded equipment is more efficient
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**68.20**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker Mini Panicker	7/26/2016
Manager	Biren Saparia Biren Saparia	7/28/2016
Chief	Digital signature Chery Porter	7/28/2016

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 222004

CIP #: 1392

Project Title: **Collection System Valve Remote Operation Structures Improvements** **Contract Number:**

Description: Improve Remote Valve Gates and their structures/function to prevent/manage/minimize the untreated water in our collection systems and Combined Sewer Overflow diverted to surface water

Lead Division: Division Leader:

Project Manager: Mini Panicker Phone: 313-267-8996 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 2,763 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	5	15	21	-	-	-	41
601997	Capital Allocation: Fringe Benefits	40%	-				2	6	9	-	-	-	17
601998	Capital Allocation: Nonpersonnel	5%	-				0	1	1	-	-	-	2
616900	Construction		-				-	978	1,391	-	-	-	2,369
617950	Contractual Engineering Service		-				334	-	-	-	-	-	334
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	341	1,000	1,422	-	-	-	2,763

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-											-
Sewer Construction Bonds	-			-	-	341	1,000	1,422	-	-	-	2,763
Sewer I&E	-											-
Project Total	$ -	$ -	$ -	$ -	$ 341	$ 1,000	$ 1,422	$ -	$ -	$ -	$ -	$ 2,763

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$341	$1,000	$1,422	$0	$0	$0	$2,763

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: **Cost Center** **Object No.** **WSS Project No.:**

S Fund No: **Cost Center** **Object No.** **SDS Project No.:**

Revised: April 4, 2017

GLWA Great Lakes Water Authority

Project Title	**Collection System Access Hatch Improvements (CIP 1393)**
Project Significance	Access Hatches are structures in the collection system to provide reliable access to buried equipment and pipe lines. Many are deteriorated and dangerous to operate.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** O&M Request

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	Access Hatches
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Design Build
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New - Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.

Include caption for the map. Map is especially important for linear assets.

Problem Statement	There are thousands of access hatches in the GLWA collection system that help us in accessing the underground equipment and pipe lines. Many of them started to rust and are deteriorating. Some are unsafe to operate. Underground structures have flowmeters, valve regulators, level sensors, In System Storage Device, regulator chambers, etc. Deteriorated hatches can lead storm water inflow into the underground structures which in turn can damage the below ground equipment especially instrumentation and control elements. Deteriorating hatches have to be located, evaluated and rehabilitated or replaced to protect the underground equipment and to reduce inflow into the collection system.
History / Background	Access hatches in the collection system are installed under various projects for providing access to underground vaults and equipment.

Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Locate the deteriorating access hatches, evaluate the existing conditions, provide the necessary replacement/ rehabilitation to minimize the inflow into the collection system and underground structures.
Related projects currently underway or planned	Various
Potential Challenges	NA
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	These gates have reached their life expectancy and the operating technology is outdated.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 7/27/2016 **Prepared By** Biren Saparia **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study	New	$0	$66	$0	$0	$0	$0	$0	$ 66	6 Mts
Design	New	$0	$198	$0	$0	$0	$0	$0	$ 198	6 Mts.
Construction	New	$0	$2,932	$2,000	$2,001	$0	$0	$0	$6,933	2 Yr.
Year Totals		$ 0	$3,196	$2,000	$2,001	$ 0	$ 0	$ 0	**$7,197**	3Yr.

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands.

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick) Do Nothing/Status Quo/Run to Failure

Description of Alternative Evaluation	NA

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate replacement or rehabilitation required.
2) Performance (Service Level / Reliability)	3	Moderate risk of performance failure
3) Regulatory (Environmental / Legal)	2	Low risk of unregulated discharge
4) O&M	3	Implementing the project will have a moderate to low positive impact on O&M
5) Public Health & Safety	4	Will have significant impact on staff and public safety(avoidance of potential accidents)
6) Public Benefit	5	Project may improve community and stakeholder confidence in GLWA
7) Financial	2	Low impact to GLWA from the perspective of increasing the revenue
8) Efficiency	3	Project will have a significant impact on improving efficiency of equipment.

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	5	12.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	3	3	9.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	2	2	7.20	If different from PM Score.
4) O&M 11%	3	2	4.40	If different from PM Score.
5) Public Health & Safety 17%	4	4	13.60	If different from PM Score.
6) Public Benefit 8%	5	3	4.80	If different from PM Score.
7) Financial 10%	2	0	0.00	No positive financial impact
8) Efficiency 9%	3	1	1.80	Minimal impact on efficiency
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**52.80**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker	7/27/2016
Manager	Mini Panicker Digital signature	7/28/2016
Chief	Biren Saparia Digital signature	7/28/2016
	Cheryl Porter	

GLWA Authority Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 222005

CIP #: 1393

Project Title: **Collection System Access Hatch Improvements** **Contract Number:**

Description: Replace or rehabilitate access hatches and access to underground assets of GLWA. Protect assets and ensure safe access to GLWA assets.

Lead Division: Division Leader:

Project Manager: Mini Panicker Phone: 313 267-8996 Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 7,197 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	8	5	5	-	-	-	18
601997	Capital Allocation: Fringe Benefits	40%	-				3	2	2	-	-	-	7
601998	Capital Allocation: Nonpersonnel	5%	-				0	0	0	-	-	-	1
616900	Construction		-				2,920	1,993	1,994	-	-	-	6,907
617950	Contractual Engineering Service		-				264	-	-	-	-	-	264
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	3,196	2,000	2,001	-	-	-	7,197

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-											-
Sewer Construction Bonds	-			-		-	3,196	2,000	2,001	-	-	7,197
Sewer I&E	-											-
Project Total	$ -	$ -	$ -	$ -	$ 3,196	$ 2,000	$ 2,001	$ -	$ -	$ -	$ -	$ 7,197

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$3,196	$2,000	$2,001	$0	$0	$0	$7,197

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** **Object No.** **WSS Project No.:**

S Fund No: 0 **Cost Center** **Object No.** **SDS Project No.:**

Revised: April 5, 2017

GLWA Great Lakes Water Authority

Project Title	**CIP-1399 Phosphorous Recovery Facility at the WWRF**
Project Significance	This study, design and construction will evaluate the cost/benefit of harvesting phosphorous from the waste stream. A secondary benefit of this facility is the reduction in struvite formation/clogging in the plant piping

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **10/27/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater Design
	Tarlochan.Bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Ravi Yelamanchi	Engineer	Wastewater Design	(313) 297-5965	Ravi.Yelamanchi@glwater.org

Site Name	GLWA WWTP
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI 48209
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Recovery of phosphorous from sludge (primary and waste activated)
Previous Project Status	New - Intended
Current CIP Project Status	New - Intended

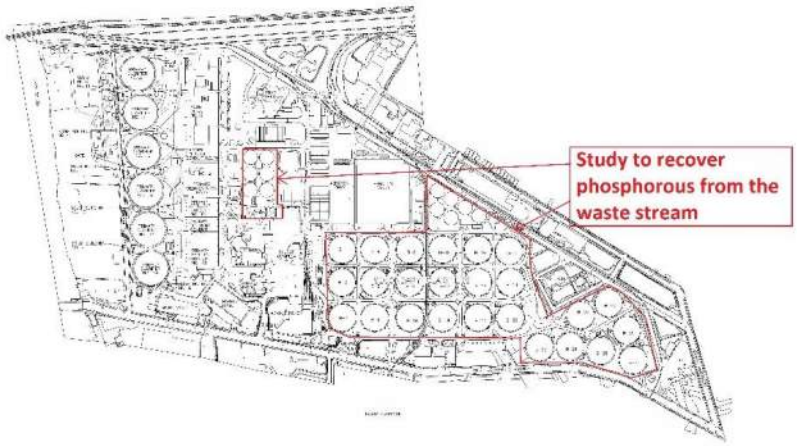
2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Complex B Sludge Lines clogged due to Struvite.

Location map of study area



Problem Statement

The NPDES permit requires continuous removal of phosphorous. GLWA removes phosphorous by adding ferric chloride upstream of the primary clarifiers. Phosphorous is also removed biologically in the aeration tanks. Phosphorous is a valuable commodity and can be recovered from the sludge streams (primary and waste activated). This study will evaluate the feasibility and cost effectiveness of phosphorous recovery at the GLWA WWTP. If feasible, the recovery of phosphorous will enhance the sustainable practices at the WWTP. This study will also be used to address a problem with struvite control at the Complex B sludge lines. Staff have notices significant struvite formation in some of the sludge lines during the replacement of valves. This struvite is the result of phosphorous, magnesium, and ammonia nitrogen crystallization in the pipelines. The buildup

	of struvite reduces the cross sectional are of the pipe and eventually can lead to full blockage.
History / Background	There are phosphorous effluent permit limits for both primary effluent (during wet weather) and for secondary effluent. Effluent limits for phosphorous were lowered again in 2016 and now stand at 1.5 mg/l for primary effluent and 0.7 mg/l (October – March) and 0.6 mg/l (April – September) for secondary effluent. GLWA has historically been able to meet the phosphorous limits for both primary and secondary effluent by adding ferric chloride to the primary clarifier influent and relying on normal phosphorous consumption in the secondary treatment process. By removing phosphorous in both the primary and secondary processes, phosphorous is then concentrated in the primary and waste activated sludges. Phosphorous is a valuable commodity that can be reused in other products such as fertilizer. The recovery of phosphorous is becoming more prevalent at other WWTPs.
Preliminary Scope of Work	The scope of work will be a study, design and construction of phosphorus recovery facility that includes: quantifying the amount of phosphorous in the sludge streams, estimating the potential amount of phosphorous that can be recovered, evaluating the potential market for recovered phosphorous, evaluating the alternatives for recovering phosphorous, developing an alternatives evaluation that includes life-cycle cost estimates and overall cost benefit analysis, identification of potential locations for a phosphorous recovery facility (if proven feasible), and preliminary layouts of facility equipment (if feasible).
Related projects currently underway or planned	Related projects include the ferric feed at both PS-1 and PS-2. These projects are for removing phosphorous from the liquid stream. The PS-1 project will also include study of alternative ferric feed locations for phosphorous removal. This study should also be coordinated with the BDF. If the BDF plans to sell the dried biosolids pellets, coordination with any required phosphorous content in the pellets needs to be done.
Potential Challenges	Potential locations for a phosphorous recovery facility.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	6 - Public Benefit
Explanation	The benefit will be in helping GLWA become a true resource recovery facility by enhancing the sustainable practices at the WWTP.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 4/12/2017 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, Const. Assistance	In Proposed CIP	$0	$0	$500	$1000	$250	$250	$0	$2,000	4 Year
Construction	In Proposed CIP	$0	$0	$0	$1000	$6000	$6000	$0	$13,000	Phase Duration
Year Totals		$ 0	$ 0	$ 500	$2,000	$6,250	$6,250	$ 0	**$15,000**	9 Month

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The study phase of this project will develop further alternatives to conduct an appropriate cost-benefit analysis for each alternative. If deemed cost effective, then a life cycle cost can be performed. One of the alternative is to do nothing and replace in kind all the existing secondary sludge lines clogged with struvite. The replacement of all the existing sludge pipe lines will be very expensive probably over $30M.
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	3	This will enhance the condition of the sludge pipes by reducing struvite formation in the piping.
2) Performance (Service Level / Reliability)	3	This will potentially enhance the performance of the sludge piping and transport systems.
3) Regulatory (Environmental / Legal)	0	No real regulatory benefit.
4) O&M	3	Will reduce pipe clogging and subsequent O&M for cleaning.
5) Public Health & Safety	3	GLWA will be viewed as a leader in phosphorous removal. High public perception.
6) Public Benefit	5	Will enhance sustainable practices.
7) Financial	5	Could provide a new revenue stream for GLWA.
8) Efficiency	4	Would increase the overall efficiency of the WWTP.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	3	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	3	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	0	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	3	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	3	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	5	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	5	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	4	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	4/12/2017	Document updated

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA Authority Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 213009

CIP #: 1399

Project Title: **Phosphorous Recovery at WRRF**

Contract Number:

Description: This study will evaluate the cost/benefit of harvesting phosphorous from the waste stream. A secondary benefit is the reduction in struvite formation/clogging in the plant piping

Lead Division: | Division Leader:

Project Manager: Tarlochan Bhullar | Phone: 313 297 5925 | Department Charged: Water X Sewage Both

Project Type: Study **(S)** X | Design **(D)** X | Construction **(C)** X | Construction Management **(CM)** | Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X | Design Build **(DB)** | Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 15,000 | Estimated Start Date *: | Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	-	-	-	-	-	-	-
601997	Capital Allocation: Fringe Benefits	40%	-				-	-	-	-	-	-	-
601998	Capital Allocation: Nonpersonnel	5%	-				-	-	-	-	-	-	-
616900	Construction		-				-	-	1,000	6,000	6,000	-	13,000
617950	Contractual Engineering Service		-				-	500	1,000	250	250	-	2,000
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	-	500	2,000	6,250	6,250	-	15,000
Funding Source(s)													
Water Construction Bonds			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E			-										-
Sewer Construction Bonds			-			-	-	-	500	2,000	6,250	6,250	-	15,000
Sewer I&E			-										-
	Project Total		$ -	$ -	$ -	$ -	$ -	$ -	$ 500	$ 2,000	$ 6,250	$ 6,250	$ -	$ 15,000

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$0	$500	$2,000	$6,250	$6,250	$0	$15,000

Requested By: | Date:

Division Manager: | Date:

Division Director: | Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: | Yes | 0 No | CMG | Date:

(circle applicable funding source): **Bond** **I&E**

Budget Approval: | Date:
Finance Manager

Accounting Approval: | Date:
Accounting Manager/ General Ledger

Authorization to Proceed: | Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** 0 **Object No.** 0 **WSS Project No.:** 0

S Fund No: 0 **Cost Center** 0 **Object No.** 0 **SDS Project No.:** 0

Revised: April 3, 2017

GLWA
Great Lakes Water Authority

Project Title	**DTE Primary Electric 3rd Feed Supply Line to the WRRF (CIP 1402)**
Project Significance	GLWA's WRRF has two independent power feeds Maxwell 1 and 2 from DTE, each capable of powering the WRRF equipment.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **7/27/2016** **Project Origin** Condition Assessment

Project Manager/Sponsor	Tarlochan Bhullar	Engineer	Wastewater Design
	tarlochan.bhullar@glwater.org		(313) 297-5925
CMG Rep	Monica Y Daniels	Manager	Financial Services
	Monica.Daniels@glwater.org		(313) 964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Rao Manyam	Engineer	Wastewater Design	(313) 297-6446	rao.manyam@glwater.org

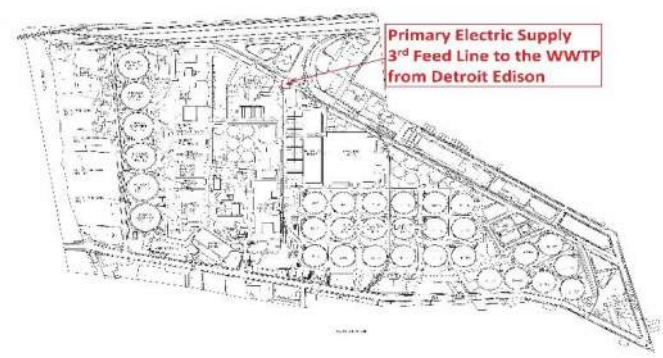
Site Name	GLWA WRRF
If Facility, Facility Address	9300 West Jefferson Avenue, Detroit, MI
Service Area	Wastewater Operating Services
Project Category	Wastewater Treatment & Ops
Project Type	Study, Design and Construction
Primary Focus	Primary Electric Supply Feed to the WRRF
Previous Project Status	Active
Current CIP Project Status	Active

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

The new 3rd 120/13.8 kV Transformer installed and owned by the Great Lakes Water Authority waiting for the 3rd Primary Electric Feed Line to be installed and energized.



Location map of Primary Electric Supply 3rd Feed Line to the WRRF from Detroit Edison

Problem Statement

GLWA's WRRF is currently served by two separate primary electrical service feed lines from the DTE Maxwell Switching Station through Maxwell 1 and Maxwell 2 supply lines. The WRRF is currently served by two 120-13.8 kV each Detroit Wastewater Industrial Substation (DETWS) Maxwell A and Maxwell B transformers with rated capacity of 37.5/50/62.5 MVA. The existing two 120-13.8 kV transformers Maxwell A and B have a throw-over capability for redundancy to either of the primary electrical services line Maxwell 1 and 2 in the event of a failure. The DTE Maxwell Switching Station is fed by two separate DTE Substation's through Maxwell-Navarre and Maxwell River-Rouge services lines. The existing two separate primary electrical feed lines to the WRRF are originating from the single Maxwell Switching Station. If the Maxwell Switching Station fails, there is no redundant primary electrical service line to the WRRF. The power failure on September 8, 2011 resulted in NPDES permit violation. The permit violation notice was issued by MDEQ through Permit Violation No. VN-005096. At the time of power failure, the DETWS Maxwell A and Maxwell B were tied together, sharing the load for the WRRF. During the evet, Maxwell A lost power and, the Maxwell A-B Tie Breaker closed automatically, as it was designed.

	The equipment that had been running off the Maxwell A transformer was transferred to Maxwell B. The transfer was not instantaneous so all the equipment and computer control systems lost power and had to be restarted. Some equipment took hours to restart back again. The NPDES Permit mandates that GLWA provide alternative power source sufficient to operate primary and secondary facilities to maintain compliance with effluent limits. The 3rd feeder from a different utility sub-station is required and this project will make WRRF's primary electrical power supply reliable and redundant.
History / Background	The WRRF has been supplied primary electrical power through the DTE Maxwell Switching Station via two power supply lines Maxwell 1 and Maxwell 2. The two main electrical buildings at the WRRF which feed the primary and secondary facilities are Electrical Building 1 and 2 (EB-1 and EB2). EB2 supply electrical power to the pump station #1 and all the primary treatment facilities. EB1 supply power to pump station #2, secondary treatment facilities, dewatering, incineration and all other remaining facilities. The City of Detroit's Public Lighting Department (PLD) provided a redundant 24kV back-up electrical services to EB2 through the City of Detroit 24kV industrial substation. In the event of DTE power supply failure the PLD 24kV power supply line provided redundancy and reliability to EB2. The back-up power supply by PLD at EB-2 required a manual switch over in the event of DTE power failure. The City of Detroit's PLD discontinued its power generation in the late 1980's. PLD also started curtailing electrical power supply distribution to its customers. The study by HRC in 1988 and later by Metcalf & Eddy in the early 90's during design and construction of Pump Station # 2 project identified the need for 3rd primary electrical supply line. In order to provide reliable and redundant primary electric power supply to the WRRF after the September 8, 2011 power failure event. GLWA initiated a consulting services contract "CS-1449 Underground Electrical Duct Bank Repair and EB-1, EB-2 and EB-10 Primary Power Services Improvements at the WRRF". This CS-1449 scope required to study and design reliable and redundant primary electrical power system improvements. The study recommended to abandon PLD's 24kV back-up electric power supply to EB-2 and replacement with 3rd power supply feed line from DTE's Waterman substation. In addition to 3rd power feed line, study also recommended a new 120-13.8 kV transformer near EB-1 and a new 15kV power supply line to EB-2, to address power redundancy and reliability. Construction of the primary power services improvements design through CS-1449 were procured through contract PC-783. The contract PC-783 in the 1st quarter of 2016 abandoned and removed the 24kV power feed line and industrial substation owned by PLD. On May 29, 2012, GLWA signed a letter of agreement with DTE to provide a 3rd 120kV feed transmission line owned by DTE (paid by GLWA) to a new 120-13.8 kV industrial substation built and owned by GLWA. The DTE agreed to obtain all required property right-of-way and easements for the route with reasonable effort per the agreement with GLWA. The PC-783 contract allocated $1.30 Million budget for DTE to execute these services. GLWA through construction contract PC-783 already installed a new 120-13.8 industrial substation near EB-1, a new 15kV power supply line from the new transformer to EB-2, and removed 24kV back-up electrical service line and industrial substation owned by PLD. However, DTE failed to get property right-of-way and easements

	for the route. DTE's original design route for transmission line was along the railroad tracks but the rail company declined to provide right-of-way for DTE's new transmission line. DTE later planned a longer transmission route to buy property from private owners, but a property owner increased the price sensing urgency for GLWA. The new cost estimate by DTE for this new transmission line is $4.3 Million. GLWA's WRRF requires a reliable and redundant electrical power supply in order to be in compliance with NPDES permit requirements. The disconnection and removal of backup power supply from PLD leaves GLWA vulnerable for power failure and this urgent power supply line needs to be installed at the earliest. In order to speed design and construction GLWA is proposing a design-build project delivery method for the 3rd power supply line project. Presently there is no true redundant primary electrical service feed line to the WRRF, both the primary electric supply lines originate from the DTE Maxwell Switching Station. GLWA's General Counsel is currently working on utilizing the "Condemn nation Process" to acquire easement from the private property owners for this route.
Preliminary Scope of Work	The scope of this design-build project includes design and construction of 3rd 120 kV primary electric supply transmission line owned by DTE tapping into the 120-kV Waterman-Zug line in the vicinity of Dearborn St. and Copland St right-of-way at Tower 1368. The design-build services also include securing the property right-of-way easements from the property owners, as well as the design and construction of power transmission supply line. This primary transmission power line will energize the already installed new 120-13.8 industrial substation owned by GLWA near EB-1.
Related projects currently underway or planned	The previous project CS-1449 and construction contract PC-783 task activities needs to continue through this project.
Potential Challenges	Negotiation with private property owners and testing of the automatic switch over will require co-ordination with operations.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project 3 - Regulatory (Environmental/Legal)

Explanation	GLWA's WRRF requires a reliable and redundant primary electrical power supply in order to be in compliance with its NPDES permit requirements. The disconnection and removal of backup power supply line and substation from PLD leaves GLWA very vulnerable in the event of power failure and this urgent 3rd power supply line to the WRRF needs to be installed at the earliest.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Opinion Of Cost

Date of Cost Estimate 7/27/2016 **Prepared By** Wastewater Design Group **Division** Wastewater

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Study, Design, Const. Assist.	New	$0	$500	$500	$0	$0	$0	$0	$1,000	2 Years
Construction	New	$0	$3000	$3000	$0	$0	$0	$0	$6,000	2 Years
Year Totals		$ 0	$3,500	$3,500	$ 0	$ 0	$ 0	$ 0	**$7,000**	2 years

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Past Years	FY2018	FY2019	FY2020	FY2021	FY2022	Future Years	Phase Total	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Choose/add phase.	Select Status of Work	$0	$0	$0	$0	$0	$0	$0	$ 0	Phase Duration
Year Totals		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**	Project Duration

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	The alternative to 3rd electrical power supply line is back-up power generators for emergency.
Description of Alternative Evaluation	The back-up power generators cost will be very high. The regular maintenance and frequent testing of these large number of generators. The space requirement for these back-up generators will be difficult to manage at the WRRF.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - FINAL D

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	The PLD back-up power supply has been disconnected
2) Performance (Service Level / Reliability)	4	The turn-over automatic switch was out of service.
3) Regulatory (Environmental / Legal)	5	If the primary power feed goes down, there is an immediate risk of non-compliance for permits.
4) O&M	4	Significant O&M cost will be required to restart the equipment after power failure.
5) Public Health & Safety	5	Permit violations would cause both air quality and water quality impacts.
6) Public Benefit	3	Public will benefit from improved water and air quality.
7) Financial	5	Exposure to multiple fines for permit violations
8) Efficiency	3	Project will have a no to moderate impact on efficiency.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	Score 0-5	0.00	Not scored by the CIP Committee
2) Performance (Service Level / Reliability) 15%	4	Score 0-5	0.00	Not scored by the CIP Committee
3) Regulatory (Environmental / Legal) 18%	5	Score 0-5	0.00	Not scored by the CIP Committee
4) O&M 11%	4	Score 0-5	0.00	Not scored by the CIP Committee
5) Public Health & Safety 17%	5	Score 0-5	0.00	Not scored by the CIP Committee
6) Public Benefit 8%	3	Score 0-5	0.00	Not scored by the CIP Committee
7) Financial 10%	5	Score 0-5	0.00	Not scored by the CIP Committee
8) Efficiency 9%	3	Score 0-5	0.00	Not scored by the CIP Committee
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Tarlochan Bhullar	7/27/2016	Document Created
Hannah Slabaugh	5/3/2017	Updated format and WWTP (Wastewater Treatment Plant) terminology to WRRF (Water Resource Recovery Facility)

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Click here to enter who is taking responsibility in-house.

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Digital signature Tarlochan Bhullar	Date
Manager	Digital signature Sanjeev Mungarwadi	Date
Chief	Digital signature Suzanne Coffey	Date

GLWA uthority
rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 216007

CIP #: 1402

Project Title: **DTE Primary Electric 3rd Feed Supply to WRRF** **Contract Number:**

Description: Protect against power outage from Maxwell Substation by adding a 3rd supply of Electricity to WWTP from a unique Waterman - Zugg Substation. Avoid NPDES non-compliance

Lead Division: Division Leader:

Project Manager: Tarlochan Bhullar Phone: . Department Charged: Water Sewage X Both

Project Type: Study **(S)** X Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** X Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 7,000 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs $(000)

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -	86	86	-	-	-	-	172
601997	Capital Allocation: Fringe Benefits	40%	-				34	34	-	-	-	-	69
601998	Capital Allocation: Nonpersonnel	5%	-				4	4	-	-	-	-	9
616900	Construction		-				3,000	3,000	-	-	-	-	6,000
617950	Contractual Engineering Service		-				375	375	-	-	-	-	750
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	3,500	3,500	-	-	-	-	7,000

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-											-
Sewer Construction Bonds	-			-	-	3,500	3,500	-	-	-	-	7,000
Sewer I&E	-											-
Project Total	$ -	$ -	$ -	$ -	$ 3,500	$ 3,500	$ -	$ -	$ -	$ -	$ -	$ 7,000

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$3,500	$3,500	$0	$0	$0	$0	$7,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No Date:

(circle applicable funding source): **Bond I&E** CMG

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** **Object No.** **WSS Project No.:**

S Fund No: 0 **Cost Center** **Object No.** **SDS Project No.:**

Revised: August 2, 2016

GLWA Great Lakes Water Authority

Project Title	**CIP 1409 – GLWA CSO Outfalls Rehabilitation**
Project Significance	Rehabilitation of GLWA CSO outfalls is essential to properly discharge the uncontrollable combined sewer overflow to the receiving waters and to prevent sewer back up into the Conveyance System. Recent inspections of the outfalls revealed fractures, missing mortar from bricks, and sediment and debris deposits in many of them.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared **3/3/2017** **Project Origin** Condition Assessment

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	CSO Outfalls
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Construction
Primary Focus	SCC- Sewer Collection System
Previous Project Status	New – Active Planning
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

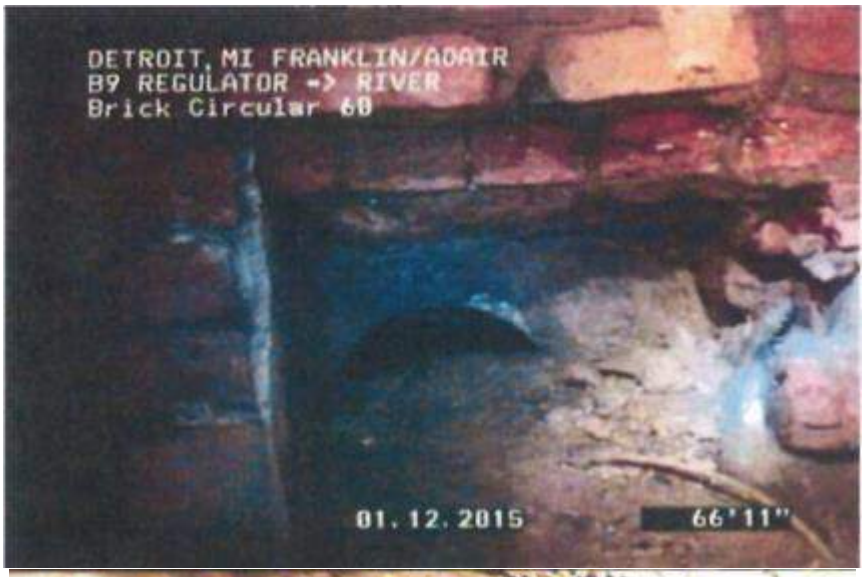


Photo Caption

Sewer Tap piping in B009 outfall

B007 – Sludge buildup along with poor masonry condition.

Preliminary Scope of Work

Outfall sewers are sewers leading from regulators to the Detroit and Rouge Rivers. There are 65 CSO outfalls in the GLWA sewer Conveyance System to relieve the excess combined sewage into the receiving waters during certain wet weather events. Recently GLWA inspected the CSO outfalls along the Detroit River and found many of them as defective. Many have missing mortar from the bricks and some have missing bricks from the sewer walls. This can lead to outfall collapses. Some are found to have debris and grease deposits in them which eventually can clog the outfalls and prevent relieving of the combined sewer overflows to the receiving waters. To prevent these situations it is necessary to rehabilitate the outfalls along both Detroit and Rouge Rivers.

History / Background	The construction of these outfalls are dated back to the early 1900s under various contracts.
Preliminary Scope of Work	Preliminary Scope of Work of the project is construction. Contract CS-168 will review the existing records, evaluate the existing conditions, and provide the necessary design to rehabilitate.
Related projects currently underway or planned	CIP 1357, CS-168
Potential Challenges	Some outfalls are below the river elevation; rehabilitation may be challenging.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

3. PROJECT DRIVER

Primary criteria driving project	1 – Condition
Explanation	Some outfalls have fractures, some have missing bricks and mortars, and some have deposits in them.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 3/3/2017 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

*P.E. = Projected Expenditures

Phase	Status	Start Date	End Date	Lifetime Actual Thru FY 2016	FY 2017 P.E.	FY 2018 P.E.	FY 2019 P.E.	FY 2020 P.E.	FY 2021 P.E.	FY 2022 P.E.	FY 2023 & Beyond	Phase Total
Study	New			$0	$0	$0	$0	$0	$0	$0	$0	$ 0
Design	New			$0	$0	$0	$0	$0	$0	$0	$0	$ 0
Const.	New			$0	$0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$36,000
Year Expenditure Totals				$ 0	$ 0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$36,000

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Start Date	End Date	Lifetime Actual Thru FY 2016	FY 2017 P.E.	FY 2018 P.E.	FY 2019 P.E.	FY 2020 P.E.	FY 2021 P.E.	FY 2022 P.E.	FY 2023 & Beyond	Phase Total
Choose/add phase.	Select Status	Start date	End date	$0	$(000s)	$0	$0	$0	$0	$0	$0	$ 0
Choose/add phase.	Select Status	Start date	End date	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0
Year Expenditure Totals				$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative A	Do nothing/Status Quo/Run to Failure
Description of Alternative Evaluation	N/A

Please describe any other alternatives evaluated:

Include description & financial calculations, REI, Cost/Benefit ratio, etc. for any other alternatives evaluated.

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance Document - 08-12-2(

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate rehabilitation required since some bricks are missing and some have cracks in them.
2) Performance (Service Level / Reliability)	3	Likelihood of serious inconveniences and business impacts for affected customers.
3) Regulatory (Environmental / Legal)	4	Compliance failure would result in environmental impact.
4) O&M	3	Reduction in reactive maintenance activities.
5) Public Health & Safety	4	Project will have a moderate positive impact on public health and safety and environment.
6) Public Benefit	4	Not implementing the project will have a chance to have a major negative public impact.
7) Financial	3	Unlikely to have wide budget implication.
8) Efficiency	1	Project will have little or no time and cost savings.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	3	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	4	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	3	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	4	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	4	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	3	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	1	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check — Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Hannah Slabaugh	4/26/2017	Information transferred to new template; data not changed.

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design & Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker Mini Panicker	3/3/2017
Manager	Biren Saparia Biren Saparia	3/3/2017
Chief	Cheryl Porter Cheryl Porter	3/4/2017

GLWA thority rogram

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 222006

CIP #: 1409

Project Title: **CSO Outfall Rehabilitation** **Contract Number:**

Description: No BCE

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 30,000 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -							-
601997	Capital Allocation: Fringe Benefits	40%	-										-
601998	Capital Allocation: Nonpersonnel	5%	-										-
616900	Construction		-				6,000	6,000	6,000	6,000	6,000	6,000	36,000
617950	Contractual Engineering Service		-				-	-	-				-
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	6,000	6,000	6,000	6,000	6,000	6,000	36,000

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-											-
Sewer Construction Bonds	-			-	-	6,000	6,000	6,000	6,000	6,000	6,000	36,000
Sewer I&E	-											-
Project Total	$ -	$ -	$ -	$ -	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 36,000

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$36,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** **Object No.** **WSS Project No.:**

S Fund No: 0 **Cost Center** **Object No.** **SDS Project No.:**

Revised: August 2, 2016

GLWA Great Lakes Water Authority

Project Title	**North Interceptor East Arm (NIEA) Evaluation and Rehabilitation from WRRF to Gratiot Ave. and Sylvester St. (CIP 1411)**
Project Significance	Evaluation of the existing condition of NIEA, and rehabilitation/replacement of portions with structural deficiencies based on the evaluation results are essential to optimize the transportation capacity of the GLWA collection system and to increase its life expectancy.

1. PROJECT SUMMARY INFORMATION

Date Business Case Prepared Click dropdown to enter date. **Project Origin** Project Origin

Project Manager/Sponsor	Mini Panicker	Engineer	SCC
	Mini.panicker@glwater.org		313-267-8996
CMG Rep	Monica Y. Daniels	Capital Management Group Manager	CMG
	Monica.daniels@glwater.org		313-964-9248

Other Project Team Members

Name	Title	Division	Phone	Email
Thomas Hall	Team Leader	SCC	313-999-1455	Thomas.hall@glwater.org

Site Name	Sewers and Interceptors
If Facility, Facility Address	GLWA Collection System
Service Area	Wastewater Operating Services
Project Category	SCC-Sewer
Project Type	Design & Construction
Primary Focus	SCC-Sewer Conveyance System
Previous Project Status	N/A
Current CIP Project Status	New - Active Planning

2. PROJECT INFORMATION

Project Photo & Map

Photo Caption

Try to include an actual picture of the project area/asset. Enter short caption/description for photo.

Include caption for the map. Map is especially important for linear assets.

Preliminary Scope of Work	GLWA plans to inspect about 48,034 lineal feet of North Interceptor East Arm (NIEA) from the WWRF to Gratiot Ave. and Sylvester St. in the next six months. We anticipate some structural deficiencies since inspections from the upstream of this segment to the North East Pump Station by NTH has revealed many structural deficiencies. This project is to develop the design and to execute the rehabilitation/replacement to address the deficiencies. As per the NPDES permit, GLWA is required to utilize the available sewage system transportation capabilities, to the maximum extent possible, for the delivery of combined sewage to the treatment facilities. This project will help GLWA to optimize the transportation capacity of NIEA
History / Background	The installation of some of the GLWA interceptors and sewers are dated back to 1912 under various contracts. NIEA inspection upstream of this segment by NTH recently revealed structural deficiencies and sludge deposits. Detroit River Interceptor inspection was recently completed and there were portions deteriorated with visible surface aggregates, attached encrustation and infiltration. Some trunk sewer inspection also revealed sludge deposition with reduced transportation capacity. Inspections of sewers to reveal the existing conditions are necessary and shall be done every

	5 to 7 years. Recommendations from these inspections may reveal further need for cleaning, rehabilitation or replacement.
Preliminary Scope of Work	Preliminary Scope of Work of the Project is as follows: Review available data, provide the necessary rehabilitation/replacement option, design and implement them to optimize the design capacity of the collection system, minimize the inflow and infiltration into the collection system, and to extend the service life.
Related projects currently underway or planned	
Potential Challenges	NIEA may have flow control challenges for both inspection and rehabilitation.
Other – important project information, photos, etc. not fitting in other	Click here to enter text; box will expand if more space is needed.

Additional Reference Documents: Use button below or include file path to network location.

Double-click here to Insert File

Enter filepath for network file, or attach file using button to the left.

3. PROJECT DRIVER

Primary criteria driving project	1 - Condition
Explanation	Recent inspections revealed portions with encrustation and deterioration.

4. PROJECTED PROJECT COSTS & SCHEDULE

Definitions are available if you hover over a blue underlined word. Numbers are in thousands unless otherwise noted.

Life Cycle Cost: The total discounted dollar cost of owning, operating, maintaining, and disposing of a facility or equipment over a period of time.

Life Cycle Cost Analysis: It is an economic evaluation technique that determines the total cost of owning and operating a facility over a period of time.

Present Value: The current value of one or more future cash payments discounted at some appropriate interest rate.

Salvage Value: The estimated value of an asset at the end of its useful life.

Equivalent Annual Cost: The annual cost of owning an asset over its entire life.

Book Values for Existing Assets – Contact CMG for Book Values and identify all WAM Asset ID's for assets being modified/replaced/rehabbed

Asset Name	WAM Asset ID	Book Value	Treatment
Asset Name	WAM Asset ID	Book Value	Rebuild, rehab, replace, etc.

Cost Estimate Source Engineer Estimate

Date of Cost Estimate 3/3/2017 **Prepared By** Mini Panicker **Division** SCC

Initial Capital Cost Estimate

This table to be filled out in initial iteration of document only. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

*P.E. = Projected Expenditures

Phase	Status	Start Date	End Date	Lifetime Actual Thru FY 2016	FY 2017 P.E.	FY 2018 P.E.	FY 2019 P.E.	FY 2020 P.E.	FY 2021 P.E.	FY 2022 P.E.	FY 2023 & Beyond	Phase Total
Design	Select Status	Start date	End date	$0	$0	$700	$700	$700	$0	$0	$0	$2,100
Construction	Select Status	Start date	End date	$(000s)	$(000s)	$6300	$6300	$6300	$(000s)	$(000s)	$(000s)	$18,900
Year Expenditure Totals				$ 0	$ 0	$7,000	$7,000	$7,000	$ 0	$ 0	$ 0	**$21,000**

Double-click here to update table calculations

Capital Cost Estimate Update

This table to be updated when project is updated. Please use actual costs where possible. Include all phases of project. Record numbers in thousands and **type 0 if there is no cost in a particular year** (the calculation will not work properly if the cells are left blank).

Phase	Status	Start Date	End Date	Lifetime Actual Thru FY 2016	FY 2017 P.E.	FY 2018 P.E.	FY 2019 P.E.	FY 2020 P.E.	FY 2021 P.E.	FY 2022 P.E.	FY 2023 & Beyond	Phase Total
Choose/add phase.	Select Status	Start date	End date	$0	$0	$0	$0	$0	$0	$0	$0	$ 0
Choose/add phase.	Select Status	Start date	End date	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$(000s)	$ 0
Year Expenditure Totals				$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**

Double-click here to update table calculations

Notes

Write any notes on the capital cost estimate table. Record reasons for change in estimate, and FY of new estimate.

5. ALTERNATIVES EVALUATION

Alternative (Pick)	**Do nothing/ Status Quo/ Run to Failure**
Description of Alternative Evaluation	N/A
Alternative (Pick)	Alternative Method Type
Description of Alternative Evaluation	Include description & financial calculations, ROI, REI, Cost/Benefit ratio, etc.

Please describe any other alternatives evaluated:

Any other calculations

6. PROJECT MANAGER PRIORITIZATION ANALYSIS

Provide details as necessary to support in the boxes below. Higher scores require more detailed justification. For scoring purposes the Project Manager shall consult the "Capital Improvement Project (CIP) Prioritization Guidance Document" which can be found below.

Guidance
Document - 08-12-2

Criteria	Project Manager Score (0-5)	Details
1) Condition	5	Immediate inspection rehabilitation required since this is a major interceptor and some areas show structural deficiencies.
2) Performance (Service Level / Reliability)	3	Likelihood of serious inconveniences and business impacts for affected customers.
3) Regulatory (Environmental / Legal)	4	Compliance failure would result in environmental impact.
4) O&M	3	Reduction in reactive maintenance activities.
5) Public Health & Safety	4	Project will have a moderate positive impact on public health and safety and environment
6) Public Benefit	4	Provide justification.
7) Financial	3	Provide justification.
8) Efficiency	1	Provide justification.
Preliminary Score (Auto-calculates based on above scores)		

7. PRIORITIZATION ANALYSIS – For CIP Committee Use Only

Prioritization Criteria. For all criteria, indicate score (0-5) from evaluation and justification for the score. Project Manager will do the initial scoring and justification in section 9. The CIP Committee will review and update the score and provide justification if different than PM score.

Refer to the Prioritization Criteria Definitions Document for detailed direction (Section 6 above).

Double-click here to update table calculations

Criteria	Project Manager Score	CIP Committee Score (0-5)	Calculated Score	CIP Committee Justification
1) Condition 12%	5	Score 0-5	0.00	If different from PM Score.
2) Performance (Service Level / Reliability) 15%	3	Score 0-5	0.00	If different from PM Score.
3) Regulatory (Environmental / Legal) 18%	4	Score 0-5	0.00	If different from PM Score.
4) O&M 11%	3	Score 0-5	0.00	If different from PM Score.
5) Public Health & Safety 17%	4	Score 0-5	0.00	If different from PM Score.
6) Public Benefit 8%	4	Score 0-5	0.00	If different from PM Score.
7) Financial 10%	3	Score 0-5	0.00	If different from PM Score.
8) Efficiency 9%	1	Score 0-5	0.00	If different from PM Score.
Total Modifier Points			Enter Modifier Points	Explain modifier points – how many given due to which criteria?
Total Score			**0.00**	

Modifier points are decided by the CIP Review Committee as outlined in the Prioritization Guidance Document.

Double-click here to update table calculations

8. ASSET MANAGEMENT GROUP COMPLETENESS CHECK

Completed by Asset Management Group.

Data completeness check Complete

9. DOCUMENT REVISION HISTORY

Completed by PM/Business Case Owner.

Name	Date of Change	Reason for Change
Name	Date	Reason

10.FINAL BUSINESS CASE REVIEW AND APPROVAL

Identification of In-house responsibility:
Design &Construction: System Control Center Contact Persons: Biren Saparia Manager Mini Panicker Engineer Thomas Hall Team Leader

I recommend approval of this Project/Change Authorization Request:

Approval Type	Name	Date
Project Manager	Mini Panicker Mini Panicker	3/3/2017
Manager	Biren Saparia Biren Saparia	3/3/2017
Chief	Cheryl Porter Cheryl Porter	3/3/2017

Double-click here to update the summary page

GLWA Authority Program

REQUEST FOR C.I.P. PROJECT NUMBER

New CIP 222007

CIP #: 1411

Project Title: **NIEA Evaluation and Rehabilitation from WRRF to Gratiot Ave. and Sylvester St.** **Contract Number:**

Description: No BCE

Lead Division: Division Leader:

Project Manager: Phone: Department Charged: Water Sewage X Both

Project Type: Study **(S)** Design **(D)** X Construction **(C)** X Construction Management **(CM)** Construction Assist. **(CA)** or Design Build Assistance **(DBA)** Design Build **(DB)** Purchase Order **(PO)** or Information Technology **(IT)**

CIP Budgeted Amount: 2018-2022FY $ 21,000 Estimated Start Date *: Estimated Completion Date *:

In-House Project Costs

Project Costs

GL Account #	GL Description	Rate	Amount	FY 2015 & Prior	FY 2016 Estimate	FY 2017 Estimate	FY 2018 Estimate	FY 2019 Estimate	FY 2020 Estimate	FY 2021 Estimate	FY 2022 Estimate	FY 2023 +	Total
601995	Capital Allocation: Salaries & Wages		$ -	$ -	$ -	$ -							-
601997	Capital Allocation: Fringe Benefits	40%	-										-
601998	Capital Allocation: Nonpersonnel	5%	-										-
616900	Construction		-				6,300	6,300	6,300	-	-	-	18,900
617950	Contractual Engineering Service		-				700	700	700				2,100
Jill: Need GL Code	Materials		-				-	-	-	-	-	-	-
617960	Other Capital Improvement Costs		-										-
	Project Total		$ -	$ -	$ -	$ -	7,000	7,000	7,000	-	-	-	21,000

Funding Source(s)

Water Construction Bonds	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water I&E	-											-
Sewer Construction Bonds	-			-	-	7,000	7,000	7,000	-	-	-	21,000
Sewer I&E	-											-
Project Total	$ -	$ -	$ -	$ -	$ 7,000	$ 7,000	$ 7,000	$ -	$ -	$ -	$ -	$ 21,000

PROJECTED EXPENDITURES FOR EACH FISCAL YEAR (000)

(000)	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	Remaining	TOTAL
WSS	$0	$0	$0	$0	$0	$0	$0	$0
SDS	$0	$7,000	$7,000	$7,000	$0	$0	$0	$21,000

Requested By: Date:

Division Manager: Date:

Division Director: Date:

Capital Management Group (CMG) - FUNDS AVAILABLE: Yes 0 No CMG Date:

(circle applicable funding source): **Bond I&E**

Budget Approval: Date:
Finance Manager

Accounting Approval: Date:
Accounting Manager/ General Ledger

Authorization to Proceed: Date:
Chief Executive Officer/Chief Operating Officer

W Fund No: 0 **Cost Center** **Object No.** **WSS Project No.:**

S Fund No: 0 **Cost Center** **Object No.** **SDS Project No.:**

Revised: August 2, 2016

Click to return to Appendix B contents