GLWA's FY 2019 - 2023 Capital Improvement Plan

GLWA CIP Committee Meeting
December 15, 2017

GLWA
Great Lakes Water Authority

Revised: December 14, 2017

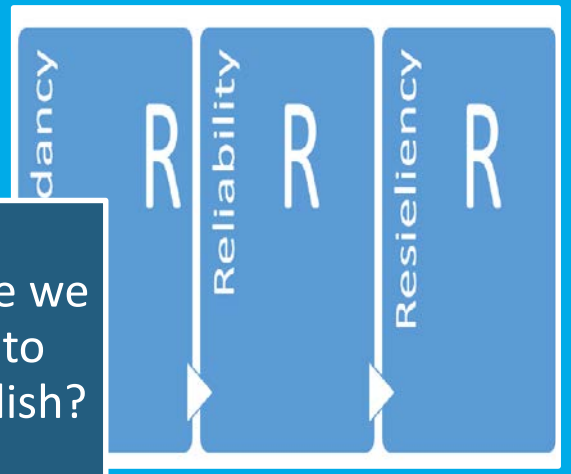
Agenda

- **CIP Introduction & CIP Changes**
  - Overview
  - New to the Process This Year
- **CIP Relationship to Financial Plan**
- **Wastewater Engineering**
  - General Strategy in Selecting Projects
  - Top Projects
- **Systems Control Center & Field Services**
  - General Strategy in Selecting Projects
  - Top Projects
- **Future Enhancement, Timing & Next Steps**
  - Likely Enhancements for Next Year
  - CIP Roll-out & Approval Schedule
  - Next Steps

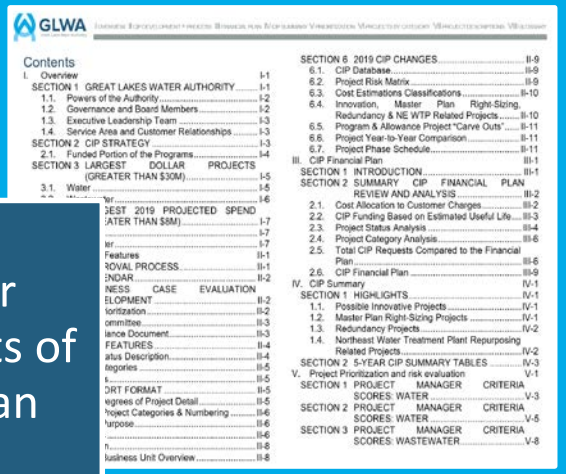
Overview

What is a CIP?

What are we trying to Accomplish?



Major elements of the plan



What is the Capital Improvement Plan?

- Five year planning document
- Requires alignment with our overall Financial Plan
- Includes large new projects or effectively gives new useful life for long-lived assets
- Long-lived means the asset has a useful life greater than 20 years
- Compilation of projects from all areas of the organization
- Used by Financial Services Area to understand when we need to issue bonds

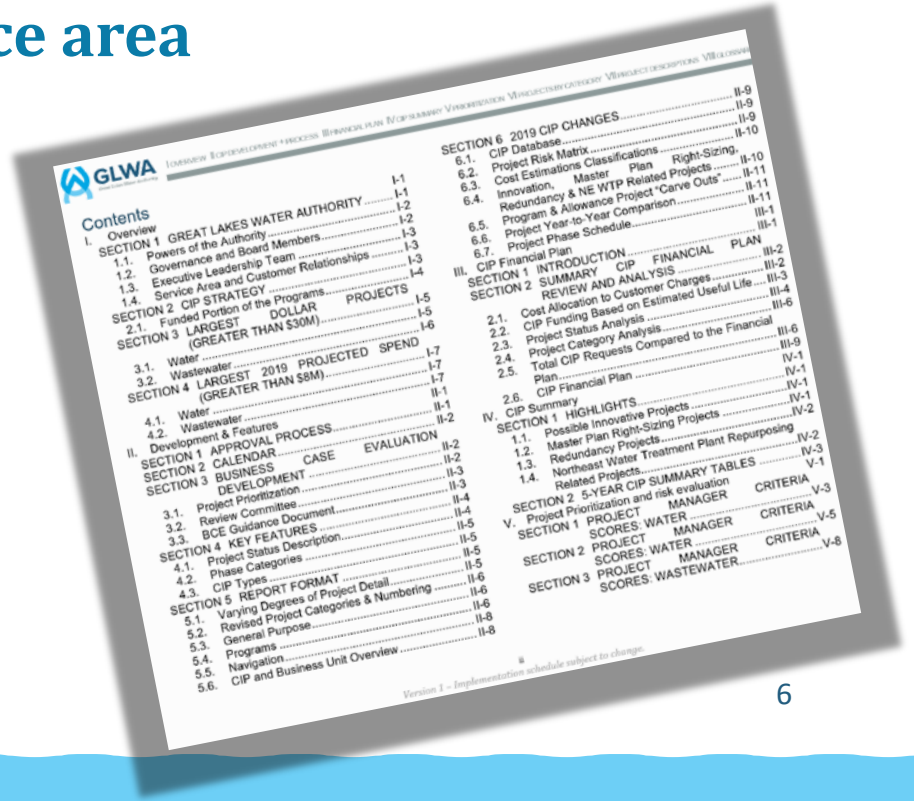
What We Are Trying to Accomplish

- Increased redundancy, reliability & resiliency of water and wastewater systems
- Adherence with long-term planning document recommendations
- Provide opportunity for stakeholders to provide input
- Best-in-class planning and execution of capital program
    - Efficient spending
    - Planning of human resource needs
    - Planning of financial resource needs

Major Elements of the Plan

I. Overview

- **GLWA incorporation, powers, governance, board members, management team, customers and service area**
- **CIP Strategy**
- **Summaries of Largest Dollar Projects**



Major Elements of the Plan

II. CIP Development and Features

- **CIP Approval Process**
- **Calendar of Critical Milestones**
- **Business Case Evaluation (BCE) Development Process**
- **Key Features & Report Format**
- **2019 CIP Changes**

Major Elements of the Plan

III. CIP Financial Plan

- **General Overview of the GLWA Financial Plan and the Relationship to the CIP**
- **Summary of the CIP Financial Plan Review & Analysis**

Major Elements of the Plan

IV. CIP Summary

- **Highlighted Project Categories**
  - ✓ **Innovation**
  - ✓ **Master Plan Right-Sizing**
  - ✓ **Redundancy**
  - ✓ **Northeast Water Treatment Plan Repurposing**
- **Line item reporting for each of the 3 major categories; Water, Wastewater and Central Services**
- **Rolled-up by Cost Center**

Major Elements of the Plan

V. Project Prioritization & Risk Evaluation

- **Project Prioritization Criteria**
- **Water & Wastewater High Level Risk Analysis**
- **Project Prioritization Ranking**

Major Elements of the Plan

VI. Projects By Category

- **Individual Listing of Each Project**
  - ✓ **2019-2023 Projected Expenditures**
  - ✓ **Complete Project Projected Expenditures**
- **Description of Asset Types Included Within Each Cost Center**

Major Elements of the Plan

VII. Project Descriptions

- **Individual Project Summaries “One-Pagers”**

VIII. Glossary

VIII. Appendices

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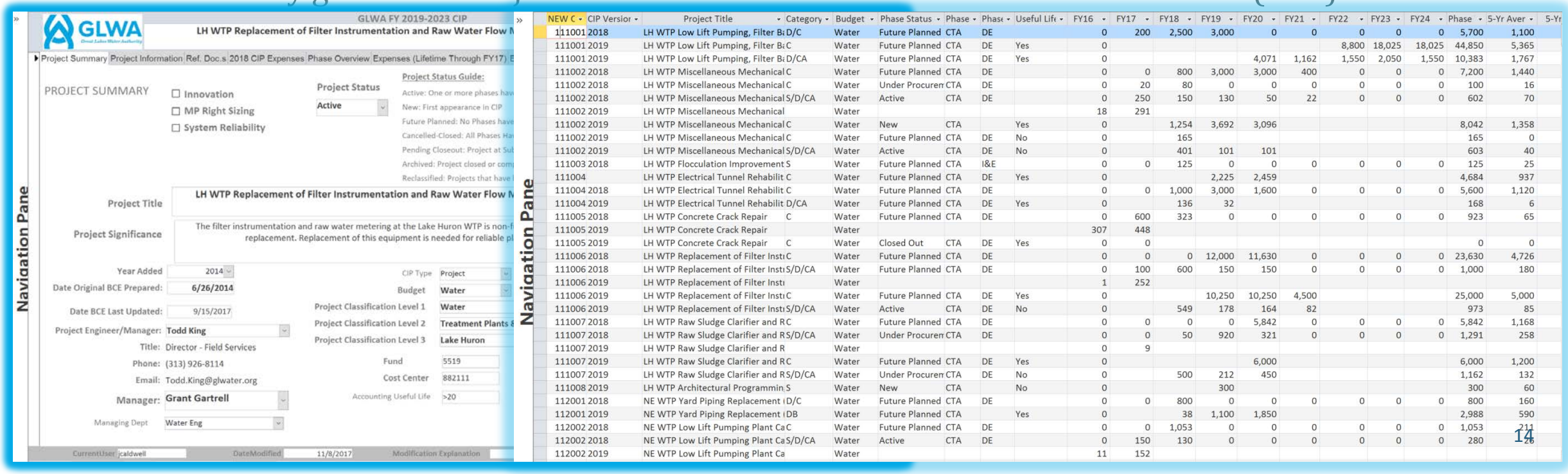
New to the Plan For This Year

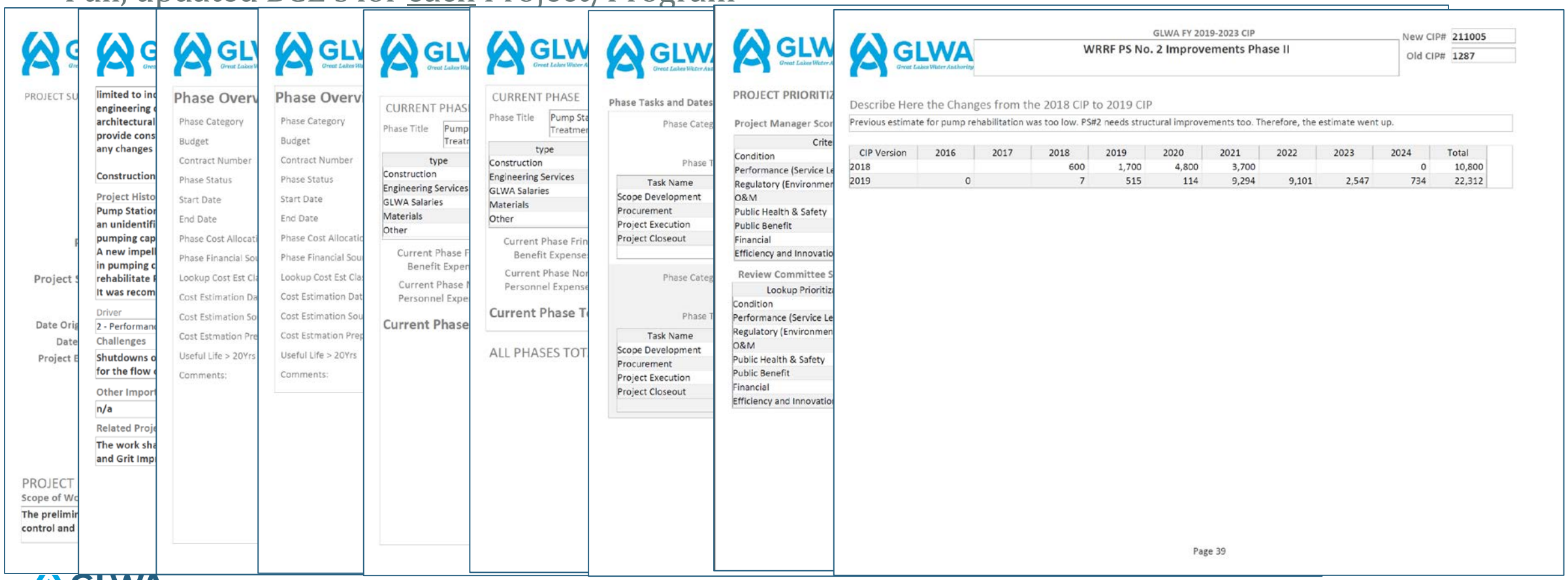
New To The Plan – Project Database

- Internal GLWA Database Development
  - Allows for Project Managers and Engineers to enter data directly
  - Easily generates queries for reporting
  - Easily generates Project Summaries and full Business Case Evaluations (BCE)



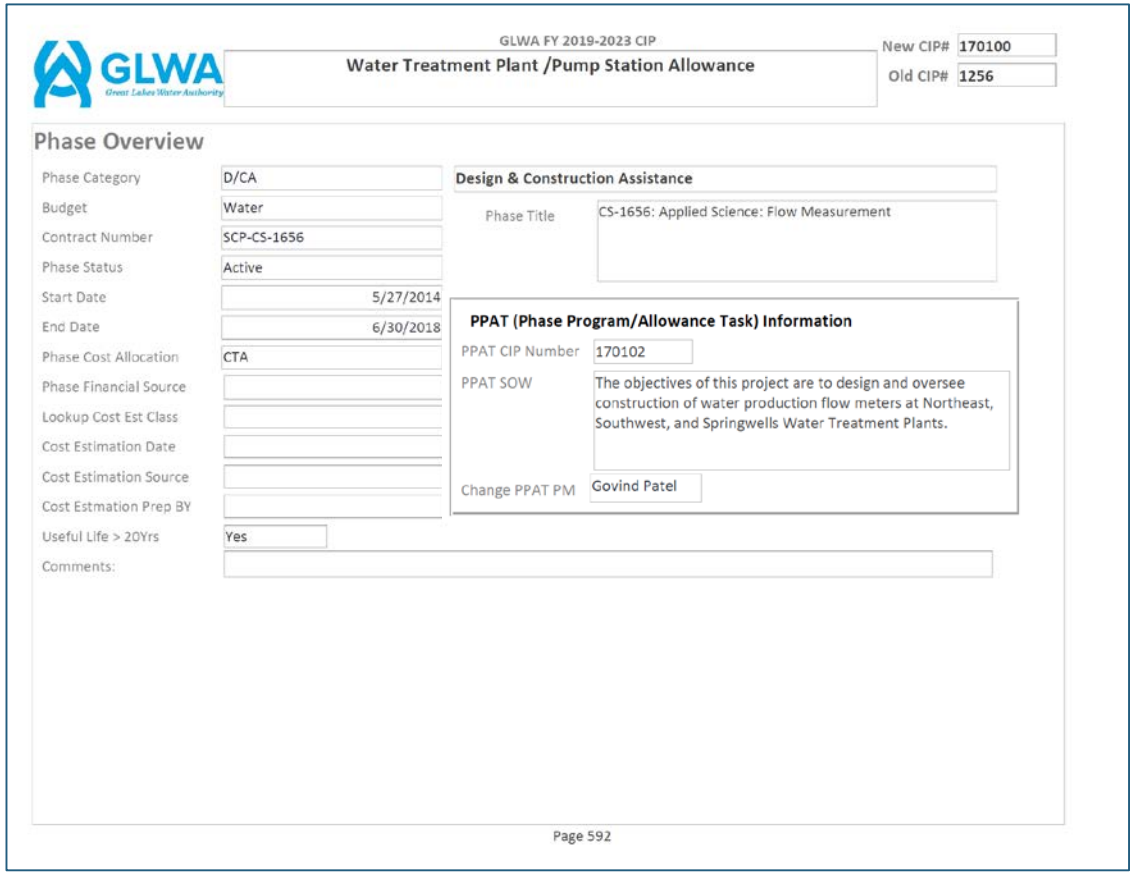
New To The Plan – Project & Program Information

- Full, updated BCE's for each Project/Program



New To The Plan – Project & Program Information

- Program & Allowance “Carve Outs”



GLWA FY 2019-2023 CIP

GLWA Great Lakes Water Authority

Water Treatment Plant /Pump Station Allowance

New CIP# 170100

Old CIP# 1256

Phase Overview

Phase Category	D/CA
Budget	Water
Contract Number	SCP-CS-1656
Phase Status	Active
Start Date	5/27/2014
End Date	6/30/2018
Phase Cost Allocation	CTA
Phase Financial Source	
Lookup Cost Est Class	
Cost Estimation Date	
Cost Estimation Source	
Cost Estmation Prep BY	
Useful Life > 20Yrs	Yes
Comments:	

Design & Construction Assistance

Phase Title: CS-1656: Applied Science: Flow Measurement

PPAT (Phase Program/Allowance Task) Information

PPAT CIP Number: 170102

PPAT SOW: The objectives of this project are to design and oversee construction of water production flow meters at Northeast, Southwest, and Springwells Water Treatment Plants.

Change PPAT PM: Govind Patel

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New To The Plan – Project & Program Information

- Project Schedule By Phase
  - Scope Development
  - Procurement
  - Project Execution
  - Project Close-Out

Phase Task Info subform

Task Name	Start Date	Duration	End Date	Phase	ID	id_Phase Tasl
Scope Development	1/8/2019	83	4/1/2019	1	30	1
Procurement	4/2/2019	209	10/28/2019	1	31	2
Project Execution	10/29/2019	1665	5/20/2024	1	32	3
Project Closeout	5/21/2024	83	8/12/2024	1	33	4
*					(New)	(New)

New To The Plan – Project & Program Information

- Project Year-to-Year Comparison

Describe Here the Changes from the 2018 CIP to 2019 CIP

moved back one year for the construction start; adjusted cost up to account for revised engineering cost estimate due to 30% design completion and more scope definition since last CIP update; added GLWA costs.

1,000s OF DOLLARS

CIP Version	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
2018		100	600	12,150	11,780					24,630

CIP Version	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
2019	$1	$252	567	10453	10436	4593	0	0	0	26,302

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New To The Plan – Project Prioritization

- Further Expansion of Project Prioritization

Recall 2018-2022 CIP we began prioritizing NEW Projects. This year we've expanded to NEW and FUTURE PLANNED projects.

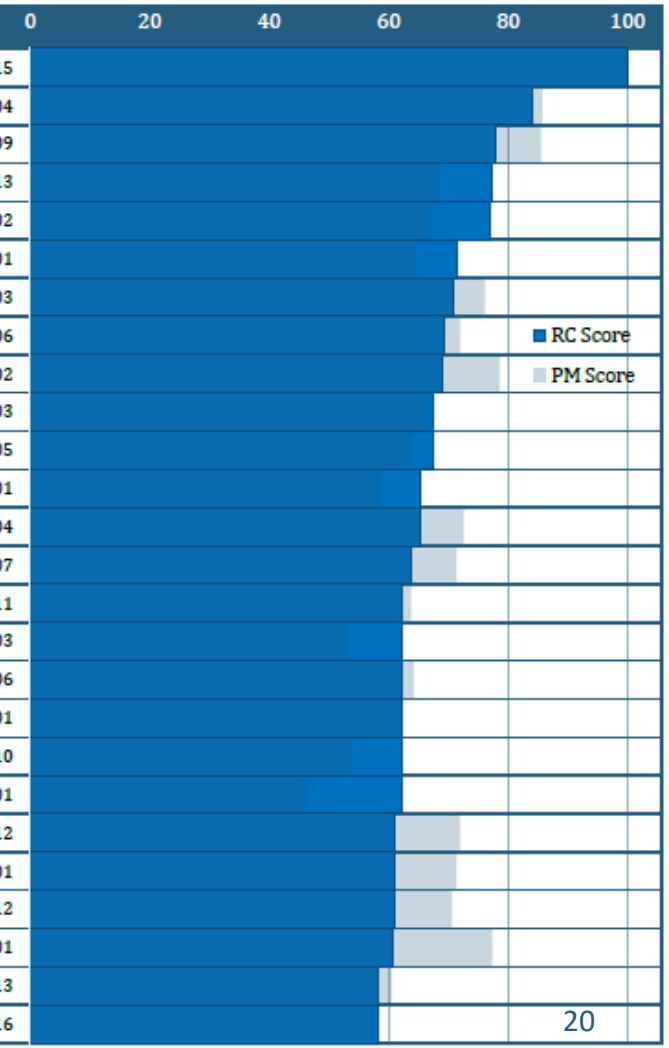
No.	Weight	Criteria	Risk Factor
1	12%	Condition	Probability
2	15%	Performance (Service Level/Reliability)	Probability
3	18%	Regulatory (Environmental/Legal)	Consequence
4	11%	O&M	Probability
5	17%	Public Health & Safety	Consequence
6	8%	Public Benefit	Consequence
7	10%	Financial	Consequence
8	9%	Efficiency & Innovation	Consequence

New To The Plan – Project Prioritization

- Coordination between Project Manager & Review Committee Prioritization Scores

SECTION 1 **PROJECT MANAGER CRITERIA SCORES: WATER**

Rank	CIP No.	Title	
1	114015	SPW WTP Emergency Grating Replacement	114015
2	115004	WWP WTP Chlorine System Upgrade	115004
3	114009	SPW WTP Service Area Redundancy Study	114009
4	114013	SPW WTP Reservoir Fill Line Improvements	114013
5	111002	LH WTP Miscellaneous Mechanical Improvements	111002
6	111001	LH WTP Low Lift Pumping, Filter Backwash Pumps...	111001
7	132003	West Service Center PS - Isolation Gate Valves for Line Pumps	132003
8	114006	SPW WTP Replacement of Rapid Mix Units 1958 Process Train	114006
9	114002	SPW WTP Low Lift and High Lift Pump Station	114002
10	113003	SW WTP Low and High Lift Pumping & Rapid Mix Chamber BFVs...	113003
11	114005	SPW WTP Administration Building Improvements & Underground...	114005
12	115001	WWP WTP Yard Piping, Valves and Venturi Meters Replacement	115001
13	122004	96-inch Main Relocation, Isolation Valves Installations...	122004
14	114007	SPW WTP Powdered Activated Carbon System Improvements	114007
15	114011	SPW WTP Steam, Condensate Return, and Compressed Air...	114011
16	122003	Waterworks Park WTP to Northeast WTP Transmission Main	122003
17	111006	LH WTP Replacement of Filter Instrumentation and Raw Water...	111006
18	114001	SPW WTP 1958 Filter Rehabilitation and Auxiliary Facilities	114001
19	114010	SPW WTP Yard Piping and High Lift Header Improvements	114010
20	112001	NE WTP Yard Piping Replacement (State Fair Valve Rehab)	112001
21	132012	Ypsilanti PS Improvements	132012
22	331001	Roofing Systems Replacement at Water Plants and Booster...	331001
23	114012	SPW WTP Water Treatment Plant 1930 Filter Building-Roof...	114012
24	351001	Water Facility Lighting Renovations	351001
25	122013	14 Mile Transmission Main Loop	122013
26	122016	Downriver Transmission Main Loop	122016



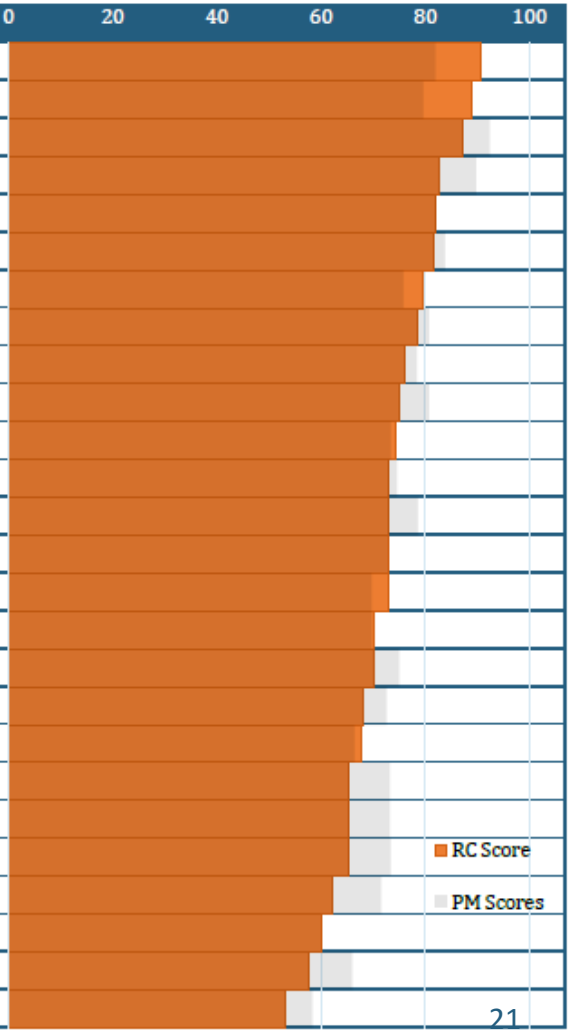
GLWA Great Lakes Water Authority

New To The Plan – Project Prioritization

- Coordination between Project Manager & Review Committee Prioritization Scores

SECTION 3 **PROJECT MANAGER CRITERIA SCORES: WASTEWATER**

Rank	CIP No.	Title	
1	260600	CSO FACILITIES IMPROVEMENT PROGRAM	260600
2	232003	Northeast Pumping Station	232003
3	213007	WRRF Modification to Incinerator Sludge Feed Systems at Complex -II	213007
4	216007	DTE Primary Electric 3rd Feed Supply to WRRF	216007
5	216004	Rehabilitation of Various Sampling Sites and PS#2 Ferric Chloride System at WRRF	216004
6	212004	WRRF Chlorination and Dechlorination Process Equipment Improvements	212004
7	232002	Freud & Conner Creek Pump Station Improvements	232002
8	216006	Rehabilitation of Potable Water, Screened Final Effluent (SFE), Natural Gas, Secondary...	216006
9	213002	WRRF Rehabilitation of Central Offload Facility	213002
10	211006	WRRF PS No. 1 Improvements	211006
11	211008	WRRF Rehabilitation of Ferric Chloride Feed System in PS-1 and Complex B Sludge Lines	211008
12	212008	WRRF Rehabilitation of Intermediate Lift Pumps (ILPs)	212008
13	211005	WRRF PS No. 2 Improvements Phase II	211005
14	260500	CSO Outfall Rehabilitation	260500
15	222007	NIEA Evaluation and Rehabilitation from WRRF to Gratiot Ave. and Sylvester St.	222007
16	211009	WRRF Rehabilitation of the Circular Primary Clarifier Scum Removal System	211009
17	251002	Wastewater System-Wide Instrumentation & Control Software and Hardware Upgrade	251002
18	222004	Collection System Valve Remote Operation Structure Improvements	222004
19	213006	WRRF Improvements to Sludge Feed Pumps at Dewatering Facilities	213006
20	222002	Detroit River Interceptor (DRI) Evaluation and Rehabilitation	222002
21	222003	North Interceptor East Arm (NIEA) Evaluation and Rehabilitation	222003
22	211007	WRRF PS #2 Bar Racks Replacements and Grit Collection System Improvements	211007
23	214001	WRRF Relocation of Industrial Waste Control Division and Analytical Laboratory...	214001
24	216005	Rehabilitation of the Main Plant Maintenance Building & Other Maintenance...	216005
25	213008	WRRF Rehabilitation of the Ash Handling Systems	213008
26	212007	WRRF Rehabilitation of the Secondary Clarifiers	212007



GLWA Great Lakes Water Authority

New To The Plan – Project Prioritization

- Project Risk Matrix

No.	Weight	Criteria	Risk Factor
1	12%	Condition	Probability
2	15%	Performance (Service Level/Reliability)	Probability
3	18%	Regulatory (Environmental/Legal)	Consequence
4	11%	O&M	Probability
5	17%	Public Health & Safety	Consequence
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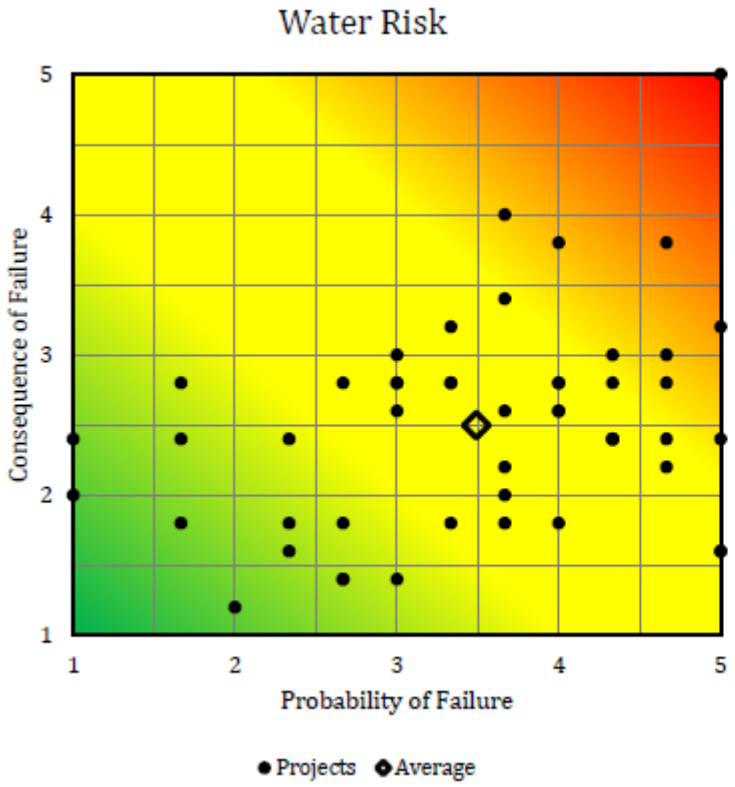

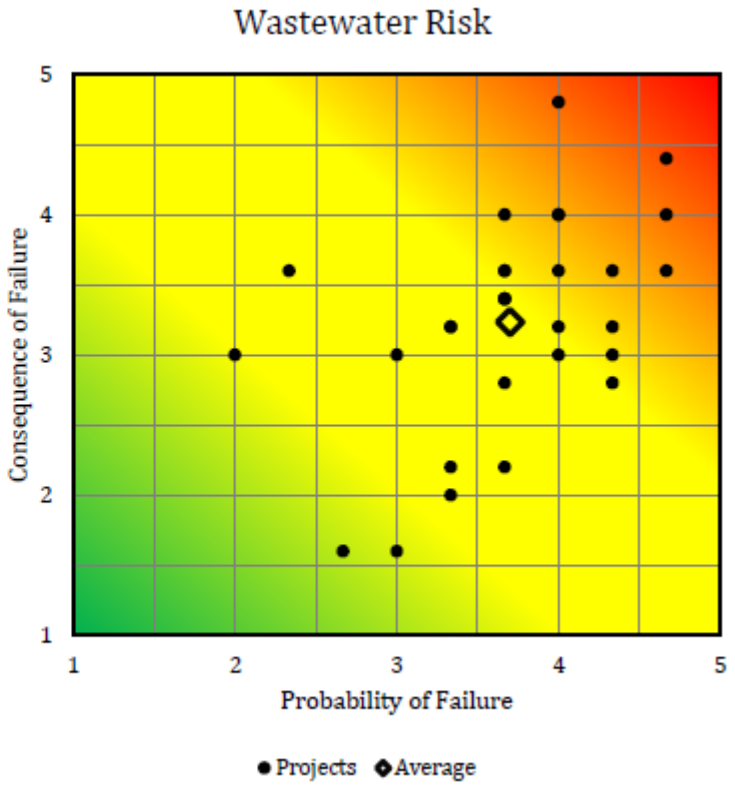

GLWA Great Lakes Water Authority

New To The Plan – Summary Tables

- 2019-2023 Top Dollar Projects (Total Greater Than $30M)

3.1. Water

Table I-1. Water Projects with 2019-2023 CIP Total Greater than $30M

CIP #	Project Title	Lifetime Actual Thru FY16	Actual FY17	Projected Expenditures									Useful Life >20	Cost Allocation
				FY18	FY19	FY20	FY21	FY22	FY23	FY24	2019-23 CIP Total	Project Total		
111001	LH WTP Low Lift Pumping, Filter Backwash Pumps & Flocculation Improvements	$0	$0	$0	$0	$4,071	$1,162	$10,350	$20,075	$19,575	$35,658	$55,233	Yes	CTA
112003	NE WTP High-Lift Pumping Station Electrical Improvements	0	0	0	0	3,488	15,750	15,750	15,750	14,550	50,738	65,288	Yes	CTA
113003	SW WTP Low and High Lift Pumping & Rapid Mix Chamber BFVs, Sluice Gates, Flocculation & Filtration System Improvements	0	0	12	50	6,222	6,222	17,675	25,190	94,720	55,359	150,091	Yes	CTA
115001	WWP WTP Yard Piping, Valves and Venturi Meters Replacement	0	9	2,050	1,831	25,150	25,140	0	0	0	52,121	54,171	Yes	CTA
116002	Pennsylvania, Springwells and Northeast Raw Water Supply Tunnel Improvements	0	10	4,651	14,651	20,224	379	0	0	0	35,254	39,905	Yes	CTA
122003	Waterworks Park WTP to Northeast WTP Transmission Main	0	19	2,500	6,604	20,050	35,050	34,050	32,050	0	127,804	130,304	Yes	CTA
122004	96-inch Main Relocation, Isolation Valves Installations, and New Parallel Main	0	460	1,678	3,684	6,292	20,926	49,684	43,734	6,464	124,320	132,462	Yes	CTA
122013	14 Mile Transmission Main Loop	0	0	42	1,694	3,380	11,578	19,581	14,682	3,589	50,915	54,546	Yes	CTA
132010	West Service Center PS - Duval Rd Division Valve Upgrades	0	0	33	2,050	11,050	11,050	11,050	2,025	0	37,225	37,258	Yes	CTA
170100	Water Treatment Plant /Pump Station Allowance	3,009	3,768	9,935	9,956	10,000	10,000	10,000	10,000	0	49,956	59,891	Yes	CTA
170400	Water Transmission Improvement Program	120	955	40	9,910	9,910	9,910	9,910	9,910	0	49,550	49,590	Yes	CTA

New To The Plan – Summary Tables

- 2019-2023 Top Dollar Projects (Total Greater Than $30M)

3.2. Wastewater

Table I-2. Wastewater Projects with 2019-2023 CIP Total Greater than $30M

CIP #	Project Title	Lifetime Actual Thru FY16	Actual FY17	Projected Expenditures									Useful Life >20	Cost Allocation
				FY18	FY19	FY20	FY21	FY22	FY23	FY24	2019-23 CIP Total	Project Total		
211001	WRRF Rehabilitation of Primary Clarifiers Rectangular Tanks, Drain Lines, Electrical/Mechanical Building and Pipe Gallery	$14	$10,229	$12,518	$22,983	$9,002	0	0	0	0	$31,985	$44,503	Yes	CTA
222001	Oakwood District Intercommunity Relief Sewer Modification at Oakwood District	0	0	0	600	13,200	12,700	11,500	0	0	38,000	38,000	Yes	CTA
232001	Fairview Pumping Station - Replace Four Sanitary Pumps	0	778	500	12,090	14,410	3,970	0	0	0	30,470	30,970	Yes	CTA
260100	WRRF, Lift Station and Wastewater Collection System Structures Allowance	2,024	12,734	5,428	10,920	12,010	10,920	13,100	12,000	0	58,950	64,378	Yes	CTA
260200	Sewer and Interceptor Evaluation and Rehabilitation Program	0	3,397	10,001	8,484	21,060	20,000	17,058	0	0	66,602	76,603	Yes	CTA
260300	Scheduled Replacement Program of Critical Assets	0	56	2,751	6,000	6,000	6,000	6,000	6,000	0	30,000	32,751	Yes	CTA
260500	CSO Outfall Rehabilitation	0	0	7,471	11,960	11,961	8,969	5,973	5,973	0	44,836	52,307	Yes	CTA
260600	CSO FACILITIES IMPROVEMENT PROGRAM	0	764	1,598	11,699	6,497	14,850	26,950	17,450	2,450	77,446	81,494	Yes	83/17

New To The Plan – Summary Tables

- 2019 Top Dollar Projects (Greater Than $8M)

4.1. Water

Table I-3. Water Projects with 2019 Projected Spend Greater than $8M

CIP #	Project Title	Lifetime Actual Thru FY16	Actual FY17	Projected Expenditures									Useful Life >20	Cost Allocation
				FY18	FY19	FY20	FY21	FY22	FY23	FY24	2019-23 CIP Total	Project Total		
111006	LH WTP Replacement of Filter Instrumentation and Raw Water Flow Metering Improvements	$1	$252	$549	$10,428	$10,414	$4,582	0	0	0	$25,424	$25,973	Yes	CTA
115004	WWP WTP Chlorine System Upgrade	0	371	912	8,882	0	0	0	0	0	8,882	9,794	Yes	CTA
116002	Pennsylvania, Springwells and Northeast Raw Water Supply Tunnel Improvements	0	10	4,651	14,651	20,224	379	0	0	0	35,254	39,905	Yes	CTA
170100	Water Treatment Plant /Pump Station Allowance	3,009	3,768	9,935	9,956	10,000	10,000	10,000	10,000	0	49,956	59,891	Yes	CTA
170400	Water Transmission Improvement Program	120	955	40	9,910	9,910	9,910	9,910	9,910	0	49,550	49,590	Yes	CTA

New To The Plan – Summary Tables

- 2019 Top Dollar Projects (Greater Than $8M)

4.2. Wastewater

Table I-4. Wastewater Projects with 2019 Projected Spend Greater than $8M

CIP #	Project Title	Lifetime Actual Thru FY16	Actual FY17	Projected Expenditures									Useful Life >20	Cost Allocation
				FY18	FY19	FY20	FY21	FY22	FY23	FY24	2019-23 CIP Total	Project Total		
211001	WRRF Rehabilitation of Primary Clarifiers Rectangular Tanks, Drain Lines, Electrical/Mechanical Building and Pipe Gallery	$14	$10,229	$12,518	$22,983	$9,002	0	0	0	0	$31,985	$44,503	Yes	CTA
212006	WRRF Rouge River Outfall (RRO) Disinfection (Alternative)	912	5,961	20,493	18,139	1,798	0	0	0	0	19,937	40,430	Yes	CTA
213007	WRRF Modification to Incinerator Sludge Feed Systems at Complex -II	0	0	7,035	10,999	3,352	0	0	0	0	14,351	21,386	Yes	CTA
222002	Detroit River Interceptor (DRI) Evaluation and Rehabilitation	0	5	2,222	11,569	6,600	0	0	0	0	18,169	20,391	Yes	CTA
222003	North Interceptor East Arm (NIEA) Evaluation and Rehabilitation	0	0	0	11,000	12,000	3,000	0	0	0	26,000	26,000	Yes	OMID
232001	Fairview Pumping Station - Replace Four Sanitary Pumps	0	778	500	12,090	14,410	3,970	0	0	0	30,470	30,970	Yes	CTA
260100	WRRF, Lift Station and Wastewater Collection System Structures Allowance	2,024	12,734	5,428	10,920	12,010	10,920	13,100	12,000	0	58,950	64,378	Yes	CTA
260200	Sewer and Interceptor Evaluation and Rehabilitation Program	0	3,397	10,001	8,484	21,060	20,000	17,058	0	0	66,602	76,603	Yes	CTA
260500	CSO Outfall Rehabilitation	0	0	7,471	11,960	11,961	8,969	5,973	5,973	0	44,836	52,307	Yes	CTA
260600	CSO FACILITIES IMPROVEMENT PROGRAM	0	764	1,598	11,699	6,497	14,850	26,950	17,450	2,450	77,446	81,494	Yes	83/17

New To The Plan – Summary Tables

- CIP Highlights
    - Master Plan Right-Sizing Projects

Table IV-2 . Master Plan Right-Sizing Projects

CIP	Title
111001	LH WTP Low Lift Pumping, Filter Backwash Pumps & Flocculation Improvements
113002	SW WTP High Lift Pump Discharge Valve Actuators Replacement
113003	SW WTP Low and High Lift Pumping & Rapid Mix Chamber BFVs, Sluice Gates, Flocculation & Filtration System Improvements
114002	SPW WTP Low Lift and High Lift Pump Station
114009	SPW WTP Service Area Redundancy Study
114013	SPW WTP Reservoir Fill Line Improvements
116004	WTP Right-Sizing Implementation Plan
122003	Waterworks Park WTP to Northeast WTP Transmission Main
122007	Hannon Road Transmission Main
122014	Romulus 48-inch Water Main Installation

New To The Plan – Summary Tables

- CIP Highlights
  - Innovation: Projects that may have a possibility at utilizing an innovative solution/process

Table IV-1. Innovation Projects

CIP	Title
111001	LH WTP Low Lift Pumping, Filter Backwash Pumps & Flocculation Improvements
170600	Water Transmission Main Asset Assessment Program
211006	WRRF PS No. 1 Improvements
211007	WRRF PS #2 Bar Racks Replacements and Grit Collection System Improvements
211008	WRRF Rehabilitation of Ferric Chloride Feed System in PS-1 and Complex B Sludge Lines
211009	WRRF Rehabilitation of the Circular Primary Clarifier Scum Removal System
212004	WRRF Chlorination and Dechlorination Process Equipment Improvements
212008	WRRF Rehabilitation of Intermediate Lift Pumps (ILPs)
213005	WRRF Complex I Incinerators Decommissioning and Reusability
213008	WRRF Rehabilitation of the Ash Handling Systems
216004	Rehabilitation of Various Sampling Sites and PS#2 Ferric Chloride System at WRRF
216006	Rehabilitation of Potable Water, Screened Final Effluent (SFE), Natural Gas, Secondary Water System and Compressed Air Pipelines & SFE Pump Station
222003	North Interceptor East Arm (NIEA) Evaluation and Rehabilitation
222007	NIEA Evaluation and Rehabilitation from WRRF to Gratiot Ave. and Sylvester St.
232003	Northeast Pumping Station
233002	Collection System In System Storage Devices (ISDs) Improvement
251002	Wastewater System-Wide Instrumentation & Control Software and Hardware Upgrade
331001	Roofing Systems Replacement at Water Plants and Booster Pump Stations
331002	Roofing Systems Replacement at GLWA WRRF, CSO Retention Treatment Basins (RTB) and Screening Disinfection Facilities (SDF)

New To The Plan – Summary Tables

- CIP Highlights
  - Redundancy

Table IV-3 . Redundancy Projects

CIP	Title
111001	LH WTP Low Lift Pumping, Filter Backwash Pumps & Flocculation Improvements
114009	SPW WTP Service Area Redundancy Study
114013	SPW WTP Reservoir Fill Line Improvements
116004	WTP Right-Sizing Implementation Plan
122001	Parallel 42-Inch Main in 24 Mile Road from Rochester Station to Romeo Plank Road
122003	Waterworks Park WTP to Northeast WTP Transmission Main
122004	96-inch Main Relocation, Isolation Valves Installations, and New Parallel Main
122005	Transmission System Water Main Work - Replacement of Schoolcraft Water Main
122006	Transmission System Water Main Work-Wick Road Parallel Water Main
122007	Hannon Road Transmission Main
122009	Water System Improvements in Joy Road from Southfield Road to Trinity
122010	Water Main Replacement within the City of Detroit - Joy Rd from Greenfield to Schaefer and Davison Ave from Lindwood to Livernois
122011	Park-Merriman Water Main-Final Phase
122012	36-inch Water Main in Telegraph Road
122013	14 Mile Transmission Main Loop
122014	Romulus 48-inch Water Main Installation
122015	30" Water main Replacement - Water main Replacement Under Jefferson & Rouge River
122016	Downriver Transmission Main Loop
132003	West Service Center PS - Isolation Gate Valves for Line Pumps
170400	Water Transmission Improvement Program
170500	Transmission System Valve Assessment and Rehabilitation/Replacement

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New To The Plan – Summary Tables

- CIP Highlights
    - Northeast WTP Repurposing

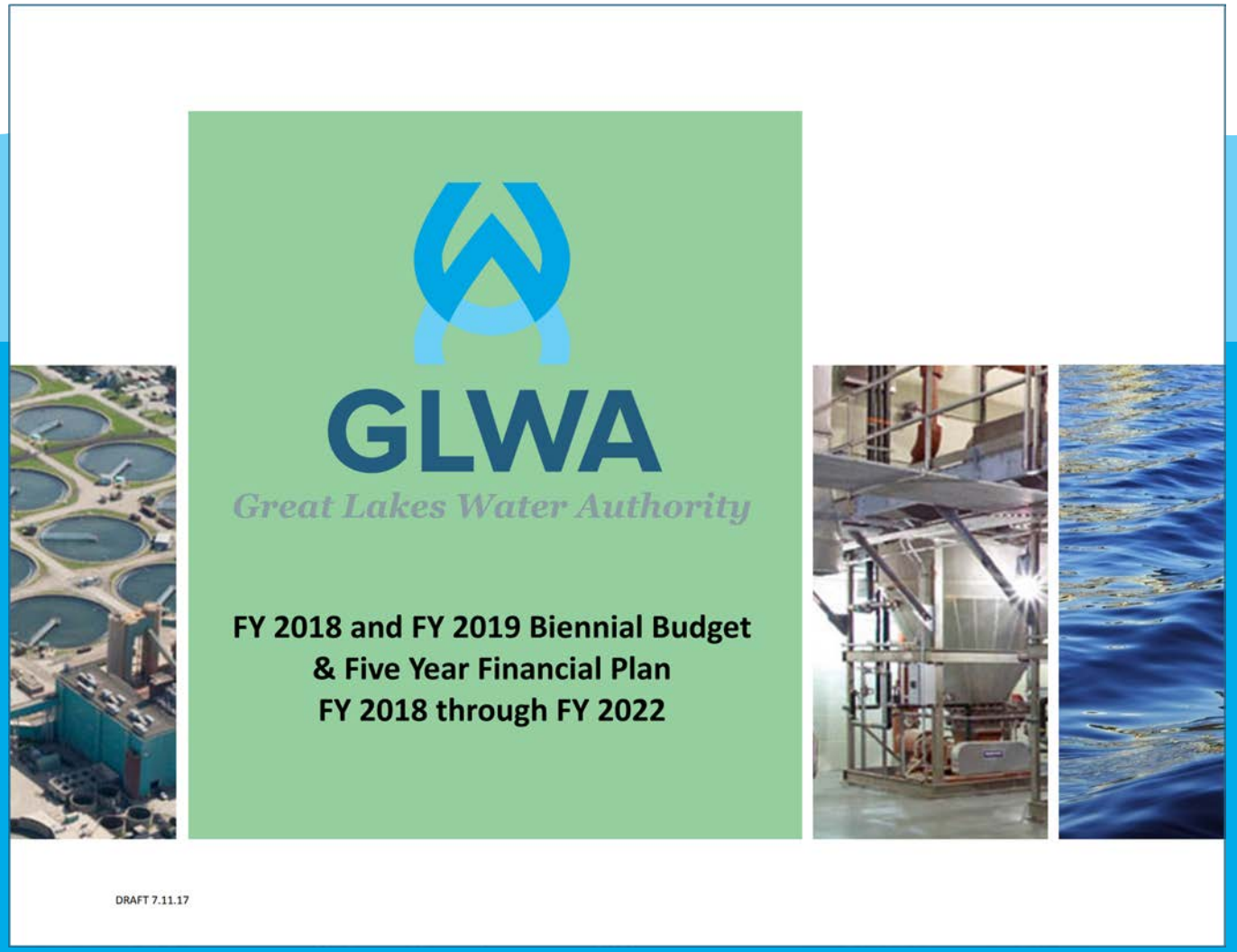
CIP	Title
114013	SPW WTP Reservoir Fill Line Improvements
115001	WWP WTP Yard Piping, Valves and Venturi Meters Replacement
116002	Pennsylvania, Springwells and Northeast Raw Water Supply Tunnel Improvements
122003	Waterworks Park WTP to Northeast WTP Transmission Main
132010	West Service Center PS - Duval Rd Division Valve Upgrades

New To The Plan – Cost Estimate Classification

- Cost Estimate Classifications
  - American Association of Cost Engineering (AACE) International system for classifying cost estimates.
  - Use a standard method to manage expectations related to the accuracy of the project phase (i.e. consultant/contractor contracts)

AACE Cost Estimate Classes		
Estimate Class	**Project Definition**	**Method**
Class 5	0% to 2%	Judgement, trend analysis, parametric
Class 4	1% to 15%	Expert opinion, trend analysis, more parametric
Class 3	10% to 40%	Combinations of detailed, unit cost, activity-based + class 4 & 5 methods
Class 2	30% to 70%	Primarily deterministic
Class 1	50% to 100%	Deterministic

CIP Alignment With The Financial Plan



Wastewater Engineering Projects

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Strategy In Wastewater Engineering Project Selection

- Add Redundancy Where Prudent and/or Economical
- Improve Reliability to Maintain Compliance
- Increase Process Efficiency

CIP Number: 216007

Old CIP No.: 1402

Project Title: DTE Primary Electric 3rd Feed Supply to WRRF

Project Status	Future Planned
Budget:	Wastewater
Classification Lvl 1:	Wastewater
Classification Lvl 2:	WRRF
Classification Lvl 3:	General Purpose

Review Committee Project Score: 82.8

- ☐ Innovation
- ☐ MP Right Sizin
- ☐ System Reliability

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

Project Significance: GLWA's WWTP will have a redundant primary electrical service to power the WRRF equipment.

Project Engineer/Manager: Phillip Kora

Manager: Philip Kora

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.

Challenges: Negotiation with private property owners and testing of the automatic switch over will require co-ordination with operations.

CIP Number: 215001

Old CIP No.: 1384

Project Title: CSO FACILITIES IMPROVEMENT PROGRAM (Reclassified)

Project Status	Reclassified	☐ Innovation
Budget:	Wastewater	☐ MP Right Sizin
Classification Lvl 1:	Wastewater	☐ System Reliability
Classification Lvl 2:	WRRF	
Classification Lvl 3:	CSO RTB & SDF	
Review Committee Project Score:		

Retrofitted chemical feed pump replacement at Puritan-Fenkell RTB and makeshift wooden stairs to enter Basin Valve Gallery

Project Significance: PROJECT RECLASSIFIED TO CIP 260600. This program is being established to facilitate the study, design, construction administration, and construction of improvements necessary to maintain the facilities which contribute to the CSO Control Program and compliance herewith.

Project Engineer/Manager: Chris Nastally

Manager: Chris Nastally

Scope of Work: This program is intended to include studies, design, construction administration, and construction projects which serve to improve process areas or functions of the CSO Facilities. The overall scope of this program is to facilitate improvements to the disinfection systems, screening systems, facility automation, safety systems, flushing systems, instrumentation & controls, electrical systems, various buildings systems (HVAC, lighting, etc.), and other miscellaneous improvements identified at the facilities throughout the life of this program. The primary drivers of these improvements will be obsolescence/end of service life, excessive O&M problems, reliability, efficiency and system standardization which arise from feedback from operation & maintenance, the scheduled replacement plan, and the needs assessment.

Challenges: As this program starts off, there is a lot of design RFPs in the beginning which will lead to large scale construction projects in the later years (3-5). A significant challenge to be faced will be maintaining the CSO facilities in current operations without the benefit of large-scale improverments of the CSO Systems. Another significant challenge of this program will be unforseen conditions that may

CIP Number: 211005
Old CIP No.: 1287
Project Title: WRRF PS No. 2 Improvements Phase II

Project Status	Active	☐ Innovation
Budget:	Wastewater	☐ MP Right Sizin
Classification Lvl 1:	Wastewater	☐ System Reliability
Classification Lvl 2:	WRRF	
Classification Lvl 3:	Primary Treatment	
Review Committee Project Score:	72.8	


Main Raw Sewage Pumps at Pump Station 2

Project Significance: This project will improve the pump reliability of PS-2 to meet the NPDES permit flow capacity requirements.
Project Engineer/Manager: Alfredo Lava
Manager: Ali Khraizat

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. The study will look into the addition of VFD to the 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. The Scope also include: 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, 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 GLWA for any changes requested by the contractor, etc.

Construction will follow after the completion of design.

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.

CIP Number: 211006
Old CIP No.: 1312
Project Title: WRRF PS No. 1 Improvements

Project Status	Future Planned	☑ Innovation
Budget:	Wastewater	☐ MP Right Sizin
Classification Lvl 1:	Wastewater	☐ System Reliability
Classification Lvl 2:	WRRF	
Classification Lvl 3:	Primary Treatment	
Review Committee Project Score:	75	


Pump Station 1 Interior

Project Significance: Inspection of condition of all pumps at pump station and rehabilitation to increase efficiency and reliability
Project Engineer/Manager: Alfredo Lava
Manager: Ali Khraizat

Scope of Work: The study/design work will identify all major parts including impellers and wear rings to be refurbished for each pump and all related appurtenances. The construction services will provide rehabilitation and/or replacement as determined in the study and design along with the sequencing of pump shutdown throughout the rehabilitation period.
Investigation and evaluation of all the inlet gates, outlet gates and associated actuators, Motor Control Centers (MCCs) and other related equipment, HVAC system, Control System and provide recommendation and design for rehabilitation or replacement are also part of the scope.

Challenges: Maintaining the adequate pumping capacity during construction will be the most significant challenge on this project.

CIP Number: 212008
Old CIP No.:
Project Title: WRRF Rehabilitation of Intermediate Lift Pumps (ILPs)

Project Status	New	☑ Innovation
Budget:	Wastewater	☐ MP Right Sizin
Classification Lvl 1:	Wastewater	☐ System Reliability
Classification Lvl 2:	WRRF	
Classification Lvl 3:	Secondary Treatment & Disinfe	
Review Committee Project Score:	72.8	


Intermediate Lift Pump Station N.2

Project Significance: The ILPs are old and reached the end of life cycle. Therefore a replacement or rehabilitation will help to comply with the permit capacity requirement for the Secondary Process Area.
Project Engineer/Manager: Beena Chackunkal
Manager: Ali Khraizat

Scope of Work: Investigation, Study including modeling, design and construction of the five intermediate lift pumps that lift primary effluent to the aeration basins for secondary treatment.

Challenges: Maintaining the required wet weather secondary capacity of 930 MGD.

CIP Number: 216006

Old CIP No.: 1381

Project Title: Rehabilitation of Potable Water, Screened Final Effluent (SFE), Natural Gas, Secondary Water System and Compressed Air Pipelines & SFE Pump Station

Project Status Future Planned

Budget: Wastewater

Classification Lvl 1: Wastewater

Classification Lvl 2: WRRF

Classification Lvl 3: General Purpose

Review Committee Project Score: 78.6

- [x] Innovation
- [ ] MP Right Sizin
- [ ] System Reliability

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

Project Significance: The utilities are vital to the operations of the WRRF. The integrity of these systems will be maintained with this project. The SFE Pump Station provides SFE water to many of the GLWA WRRF treatment processes and needs to be completely rehabilitated to maintain uninterrupted supply of SFE water to these processes. The Secondary Water system needs to be relocated or completely refurbished to provide uninterrupted water for fire protection and process applications such as seal water to the pumps.

Project Engineer/Manager: Ali Khraizat

Manager: Ali Khraizat

Scope of Work: This project will include the study, design, and construction for the needed improvements to the SFE and Secondary Water pump stations. This includes required capacity, pumps, strainers, piping, controls, building improvements, and electrical supply. It is possible that the secondary water system may need to be relocated. This will also include a study to evaluate the potential for replacing the secondary water utilization with SFE utilization where feasible and an alternative analysis to the existing carrier water at chlorination/dechlorination facility. The distribution models for both water systems will also be updated. A redundant potable water feed to the WRRF will also be evaluated. The evaluation of all alternatives will include the ability to reduce energy and potable water usage.

This project will also include study, design and construction of the repair/replacement of the aging and corroded pipes, valves and fittings for the Potable Water Supply System, the Natural Gas system, the SFE system, and the Compressed Air System.
The As Builts for all the utilities will be generated as part of this project.

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CIP Number:	**214001**
Old CIP No.:	1285
Project Title:	**WRRF Relocation of Industrial Waste Control Division and Analytical Laboratory Operations**
Project Status	Future Planned
Budget:	Wastewater
Classification Lvl 1:	Wastewater
Classification Lvl 2:	WRRF
Classification Lvl 3:	IWC
Review Committee Project Score:	62.2

☐ Innovation
☐ MP Right Sizin
☐ System Reliability

Old IWC and Analytical Lab; new one will be built at the location of the WRRF because of Gordie Howe International Bridge Project

Project Significance:	Laboratory Optimization, Continued operation of IWC and Lab, lease termination for analytical laboratory, and utilization of available space in WRRF NAB
Project Engineer/Manager:	Beena Chackunkal
Manager:	Ali Khraizat
Scope of Work:	Relocate Industrial Waste Control Division and Analytical Lab to New Administration Building at WRRF. Consolidate the existing Operations Lab with Analytical Lab.
Challenges:	Maintaining the laboratory operations during relocation.

Systems Control and Field Projects

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Strategy In SCC and Field Project Selection

- Improvement in Reliability
- Increased Resiliency

CIP Number: 222001

Old CIP No.: 1286

Project Title: Oakwood District Intercommunity Relief Sewer Modification at Oakwood District

Project Status Future Planned

Budget: Wastewater

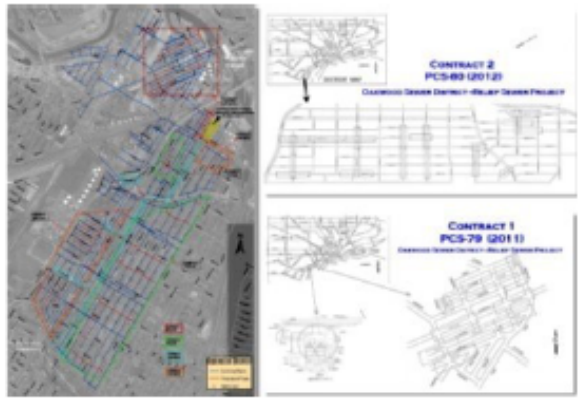
Classification Lvl 1: Wastewater

Classification Lvl 2: Field Services

Classification Lvl 3: Interceptors

Review Committee Project Score: 51.8

- ☐ Innovation
- ☐ MP Right Sizin
- ☐ System Reliability



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 betwe

Project Significance: Improvements to the Oakwood District Sanitary Sewer system and implementation of various projects as recommended in report by Applied Sciences, Inc. Dated 2/26/16. Projects to include: 1) Clean & Inspect Trunk Sewers, 2) Analysis and improvement of Oakwood PS/RTB operations, 3) Second influent sewer to Oakwood PS, and 4) NWI Diversion for CSO Control. Projects to be prioritized and validated as part of Wastewater Master Plan Project (GLWA CS-036).

Project Engineer/Manager: Todd King

Manager: Todd King

Scope of Work: The work includes basis of design (study) report on alternative solution to proposed Oakwood District Intercommunity Relief Sewer, diversion of storm water flow, and construction assistance during construction phase of emerging projects. Coordinate with DWSD projects including catch basin restrictions and green spaces.

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 for the project to address.

CIP Number:	**260200**
Old CIP No.:	1263
Project Title:	**Sewer and Interceptor Evaluation and Rehabilitation Program**
Project Status	Active
Budget:	Wastewater
Classification Lvl 1:	Wastewater
Classification Lvl 2:	Programs
Classification Lvl 3:	Programs
Review Committee Project Score:	

☐ Innovation
☐ MP Right Sizin
☐ System Reliability

An example interceptor

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.
Project Engineer/Manager:	Mini Panicker
Manager:	Biren Saparia
Scope of Work:	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.
Challenges:	Large sewers and interceptors may have flow control challenges for both inspection and rehabilitation.

CIP Number: 260500

Old CIP No.: 1409

Project Title: CSO Outfall Rehabilitation

Project Status Future Planned

Budget: Wastewater

Classification Lvl 1: Wastewater

Classification Lvl 2: SCC

Classification Lvl 3: Interceptors

Review Committee Project Score: 72.8

- ☐ Innovation
- ☐ MP Right Sizin
- ☐ System Reliability

Sewer tap piping in B009 outfall (left) and sludge buildup and poor masonry in B007 outfall (right)

Project Significance: PROJECTS 222005, 222006 AND 233001 HAVE BEEN INCORPORATED INTO THIS PROJECT. Rehabilitation of the CSO outfalls is essential to properly discharge the uncontrollable combined sewer overflows to the receiving waters and to prevent sewer back up into the Conveyance System. Recent inspections of the outfalls revealed structural deficiencies like fractures, missing mortar from bricks etc. There are sediment and debris deposits in many of them.

Project Engineer/Manager: Mini Panicker

Manager: Biren Saparia

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 the outfalls.

Challenges: Some outfalls are below the river elevation; rehabilitation may be challenging.

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Future Enhancements, Timing and Next Steps

Timing

Review Comments due **January 5, 2017**, however, throughout this process all feedback, comments and suggestions are welcomed!

Date	Description
October 2017	Review Committee Meetings
October 12, 2017	Executive Leadership Team Reviews BCE's & Modifications to CIP
October 24, 2017	Introduce New BCE's & Major CIP Modifications to AM/CIP Customer Outreach Work Group
November 2017	Executive Leadership Team Reviews BCE's & Modifications to CIP
December 15, 2017	First GLWA CIP Committee Review of CIP – Version 1
December 19, 2017	First Customer Review of CIP – Version 1 at Customer Charges Rollout Meeting #1
January 19, 2018	Second GLWA CIP Committee Review of CIP – Version 2
January 23, 2018	Second Customer Review of CIP – Version 2 at AM/CIP Customer Outreach Work Group
January 24, 2018	First GLWA Board Meeting for Review of CIP – Introduction
February 28, 2018	Second GLWA Board Meeting – Proposed CIP Adoption
March 14, 2018	Proposed Alternate GLWA Board Meeting for CIP Adoption
July 1, 2018	Effective Date of 2019-2023 CIP

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Future Enhancements

- Project Return on Investment (ROI) Considerations – Future Plans
  - Pilot will be underway in 2018
  - Include Project ROI information in future CIP
- Obtain Project Cost Estimate Classifications – Version #2

It’s all about Continuous Improvement

It’s a work in progress……Your feedback is greatly appreciated!

Next Steps

- Water Engineering to Complete Full Project Timing & Resource Review
- Financial Analysis by CFO Regarding Financial Plan Alignment
- Obtain Cost Estimate Classifications
- Gather Input from GLWA CIP Committee
- Gather Input from Customer Members
- Creation of Version 2
- Present to GLWA CIP Committee
- Present to Board with Charges

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Questions

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Have a Great Day!