



# Albert Whitted Water Reclamation Facility Operation Alternatives Report

Task Order No. 08-5-CDM/W

Project No. 10042-111

***FINAL REPORT***

October 2010





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# Executive Summary

The City of St. Petersburg (City) authorized Camp Dresser and McKee Inc. (CDM) to provide an evaluation for the continued operation of Albert Whitted Water Reclamation Facility (AWWRF). This study was performed using present worth analysis, based on marginal cost, for keeping the AWWRF in service (operational) versus two alternatives for flow diversion and treatment if the AWWRF were taken out of service.

The main driver for this evaluation was the requirement by the Florida Department of Environmental Protection (FDEP) for City to manage their reject water via reject water storage (and subsequent re-treatment) rather than direct disposal via the existing injection wells. This new reject storage will not only have to be built and operated, adding significant costs to the City, but will also have to be located off-site owing to space limitations at the existing facility location. Because of these and other reliability concerns discussed in this report, the City decided to evaluate alternatives to the continued operations and maintenance of the aging AWWRF. Alternatives evaluated included various flow diversion options which would divert the flow currently serviced by the AWWRF to one or more of the City's other water reclamation facilities.

To facilitate the evaluation, flow projections for each of the City's four water reclamation facilities were developed. Flow projections utilized historical growth data, in addition to projections for future growth due to development and potential High Speed Rail impacts. The flow peaking factors are important in sizing the pumping and piping systems necessary for flow diversion. The City has actively been improving (lowering) the peaking factors in the last few years as a result of its efforts to better seal its aging sewer infrastructure against infiltration and inflow. Therefore, the peaking factors used in this evaluation were determined from historical 5-year flow data.

Of the multiple flow diversion alternatives evaluated, the two most favorable flow diversion alternatives, based on cost and operational flexibility, were selected for further evaluation. The two flow diversion alternatives selected included one alternative to send all flow to the Southwest Water Reclamation Facility (SWWRF) and a second flow diversion alternative that split the flow between the Northwest Water Reclamation Facility (NWWRF) and the SWWRF. The flow diversion alternatives developed included a master pump station, in proximity to AWWRF, and new force main(s) which would discharge to the other treatment facilities.

A 20-year study period (FY 2011 through FY 2030) was utilized for the estimation of costs and data related to the present worth analysis and comparison of alternatives. For capital costs including replacement and rehabilitation (R&R) costs, a salvage value was estimated for the asset at the end of the study period. The present worth of this salvage value was included as a credit (negative cost) in the overall present worth

analysis for each alternative. The use of this salvage value credit allows all of the alternatives to be considered “equivalent” for comparison in this evaluation.

**Table E-1** presents a comparison of the three present worth analyses.

**Table E-1. Present Worth Comparison**

Present Worth for the Study Period			
	KEEP AWWRF OPERATIONAL	AWWRF FLOW DIVERSION TO SWWRF	AWWRF FLOW DIVERSION TO SWWRF AND NWWRF
<b>Capital Costs</b>			
New Capital Costs (Minus Salvage Value)	\$12,699,445	\$31,194,252	\$38,505,008
Replacement (CIP) Costs (Minus Salvage Value)	29,556,306	417,256	640,455
Operation & Maintenance Costs	43,536,522	22,401,715	22,726,164
<b>Total Present Worth</b>	<b>\$85,792,273</b>	<b>\$54,013,223</b>	<b>\$61,871,628</b>

In this comparison, the difference in present worth between keeping AWWRF operational and flow diversion to SWWRF is almost 60 percent and the difference in present worth between keeping AWWRF operational and flow diversion to SWWRF and NWWRF is almost 40 percent.

Therefore, from this study and based on present worth comparison, proceeding with either flow diversion to SWWRF or flow diversion to SWWRF and NWWRF would be the better choice for the City over continued operations at the AWWRF.

Present worth for flow diversion to SWWRF and NWWRF is approximately 15 percent higher than flow diversion to SWWRF alone due to the higher initial capital costs for this alternative. However, flow diversion to SWWRF and NWWRF provides the City with greater reliability and flexibility to deal with future flows. This type of reliability and flexibility is not normally designed into most Florida municipal wastewater facilities. Therefore, the additional costs may not be justified.

It is recommended that the City proceed with the conceptual design of flow diversion using SWWRF as the receiving facility.

Although the focus of this evaluation study was a marginal cost based comparison using present worth methodology, some non-economic considerations would also support the recommendation to proceed with the conceptual design of flow diversion. These include reliability, expandability, regulatory considerations, and sustainability, and are further discussed in Section 6 of this report.

# Section 1

## Introduction

### 1.1 Background

The City of St. Petersburg (City) currently operates the following four water reclamation facilities:

- Albert Whitted Water Reclamation Facility (AWWRF)
- Southwest Water Reclamation Facility (SWWRF)
- Northwest Water Reclamation Facility (NWWRF)
- Northeast Water Reclamation Facility (NEWRF)

The City has contracted with Camp Dresser and McKee Inc. (CDM) to provide an evaluation for the continued operation of the AWWRF. Under this authorization, CDM's study will include a present worth analysis based on marginal cost for keeping the AWWRF in service (operational) versus two alternatives for flow diversion and treatment if the AWWRF were taken out of service. The flow diversion alternatives will include installing a master pump station in proximity to AWWRF (either on-site or just off-site) and new force main(s) which would discharge to the other treatment facilities.

The main driver for this evaluation was the requirement by the Florida Department of Environmental Protection (FDEP) for City to manage their reject water via reject water storage (and subsequent re-treatment) rather than direct disposal via the existing injection wells. In the event that effluent could not meet FDEP requirements, a reject event, an alternate source of effluent disposal would be needed in the form of reject storage. The existing 2 million gallon (MG) effluent storage tank cannot provide sufficient reject storage and the on-site space constraints preclude the siting of new reject storage tank(s) at the current location of AWWRF. In addition to the tight site constraints, the existing site must also be sensitive to height limitations due to the proximity to the existing runways.

The existing AWWRF is the smallest and oldest of the City's four water reclamation facilities (WRFs). Flow projections, which are further discussed in Chapter 2 of this report, indicate that the other three WRFs have ample permitted capacity to accommodate the anticipated flows through the year 2030 without continued utilization of the AWWRF. As an alternative to the additional costs that would be incurred for reject storage, and other reliability concerns discussed in this report, the City decided to evaluate alternatives to the continued operations and maintenance of the aging AWWRF. Alternatives evaluated included various flow diversion options which would divert the flow currently serviced by the AWWRF to one or more of the City's other water reclamation facilities. With a flow diversion alternative, the AWWRF would be taken out of service, avoiding the need for the new reject storage.

In order to facilitate the final selection of the two flow diversion alternatives, a technical memorandum was first developed which presented a broader list of potential flow diversion alternatives. The final two flow diversion alternatives selected, based on cost and operational flexibility, included one alternative that sent all flow to the SWWRF and a second flow diversion alternative that split the flow between the NWWRF and the SWWRF.

The final three alternatives for evaluation include:

- Keep AWWRF Operational Alternative
- Divert all flow to the SWWRF Alternative
- Divert flow between the NWWRF and SWWRF Alternative

## 1.2 Methods Used to Analyze Alternatives

This report presents a summary of the data utilized for the comparison of the alternatives, development of potential flow diversion alternatives, further development of capital, operation, and maintenance costs for each of the three final alternatives (keep AWWRF operational, flow diversion to SWWRF, and flow diversion to both NWWRF and SWWRF), and the present worth, marginal cost analysis. Historical data specific to the WRF was utilized when available.

The intent of this evaluation was to provide a marginal cost comparison between the final three alternatives. Caution should be used when referencing these marginal cost estimates for budgetary or planning purposes as the actual project costs may exceed the marginal costs presented herein.

The methodology used for the present worth analysis was based on the U.S. Department of Commerce's text "*Life Cycle Costing Manual for the Federal Energy Management Program*", 1996. This reference text utilizes a detailed life-cycle cost analysis methodology and provides an assessment of the long term cost effectiveness of a project.

Generally, for planning level marginal cost based present worth comparison, a 15 or 20 year period is selected for evaluation. For this study, a twenty year period takes the evaluation to 2030, the latest year for which flow capacity/demand projections are available under the City's 201 Facilities Plan, CDM, April 2010. A twenty year study period was selected to correspond to the City's fiscal year (FY) 2011 which begins on October 1, 2010 through FY 2030 which ends on September 30, 2030.

## 1.3 Report Structure

Section 1 of this report provides a brief background for this evaluation study. Once the study period was finalized with the City staff (20 years), the first task included a projection of wastewater flows for various service areas within the City for the selected study period.

Section 2 details the wastewater flow projections that are included in this study.

In Section 3, potential flow diversion alternatives – alternatives to keeping AWWRF operational (in-service) - are discussed along with the selection of two flow diversion alternatives for this present worth analysis.

Section 4 includes the development of Capital costs and Operations and Maintenance (O&M) costs for the three alternatives. Capital costs include new construction as well as rehabilitation and replacement costs. O&M costs include administrative costs, chemical costs, power costs, personnel etc.

In Section 5, a present worth analysis is performed for the marginal costs developed for each of the three alternatives. Appropriate escalation and discount rates are employed to allow easy comparison of the present worth of the alternatives in 2011 dollars.

Section 6 presents the conclusions and recommendations resulting from the present worth analysis of the three alternatives.

# Section 2

## Flow Projections

This section of the report provides the development of flow projections and peaking factors which are utilized to determine the available future capacities for the four existing WRFs. This information was also previously presented to the City in the *Flow Diversion Alternatives Memorandum*, CDM, July 2, 2010.

### 2.1 Flow Projections

The study/planning period for this evaluation is a 20-year period from October 1, 2010 through September 30, 2030. Consequently, flow projections have been made for the study period for the various wastewater treatment facilities.

Base flow (annual average daily flow - AADF) projections in million gallons per day (MGD) utilized for these alternative evaluations were taken from the 201 Facilities Plan, CDM, April 2010 and are presented in **Table 2-1**. These flow projections were calculated utilizing population projections provided by the City of St. Petersburg Development Services Traffic Analysis Zones, 2009 in combination with per capita daily flows which were calculated using 2009 actual flow data from the four WRFs and population data.

**Table 2-1. Flow Projections from 201 Facilities Plan**

Year	Projected AADF Flows (MGD)			
	AWWRF	NEWRF	NWWRF	SWWRF
2010	5.93	8.45	9.96	9.81
2015	6.02	8.52	10.00	9.89
2020	6.09	8.57	10.01	9.94
2025	6.15	8.62	10.02	9.99
2030	6.20	8.65	10.03	10.03

#### 2.1.1 Additional Flows Due to Development

The potential for additional flows through development have been identified for the NEWRF service area. These additional developments and their potential additional average daily flow (ADF) include the following:

- Pinellas Park - 1.01 MGD (ADF)
- Jabil - 0.20 MGD (ADF)
- Sod Farm - 0.56 MGD (ADF)
- Toy Town - 1.04 MGD (ADF)

If all of these proposed developments are completed in accordance with their current completion schedule, the NEWRF could realize an additional 2.81 MGD (ADF) of flow.

**Table 2-2** presents the revised flow projections, assuming that 50 percent of the potential additional flows for NEWRF are realized in the year 2010 and 100 percent of additional flows are realized in the year 2015 (this assumption has a nominal impact on the overall flow projection for NEWRF in 2030). For subsequent five year intervals (2020 – 2030), the same percentages of increase noted for the NEWRF per five year period in Table 2-1 were applied to the additional 2.81 MGD (ADF) to provide the total updated flow projections for these years.

**Table 2-2 - Flow Projections Including NEWRF Planned Developments**

Year	Projected AADF Flows (MGD)			
	AWWRF	NEWRF	NWWRF	SWWRF
2010	5.93	9.85	9.96	9.81
2015	6.02	11.33	10.00	9.89
2020	6.09	11.40	10.01	9.94
2025	6.15	11.46	10.02	9.99
2030	6.20	11.50	10.03	10.03

### 2.1.2 Potential High Speed Rail Impacts

A high-speed rail (HSR) system, which will provide a connection from Orlando to Tampa, is currently in planning phase. Pinellas County Economic Development plans include a HSR extension from the Tampa HSR terminal to the City of St. Petersburg with additional rapid transit bus service interconnecting throughout the City. To account for potential growth in the WRF service areas due to the proposed interconnected transit system, potential increases in wastewater flows were applied to each of the four WRF service areas. The HSR connection from Orlando to Tampa would need to be constructed and operational prior to a connection to St Petersburg and therefore the year 2020 was selected as the first year when HSR impacts may be realized.

A data search was performed to identify potential impacts on wastewater flows due to implementation of a HSR system. Data reviewed included the cities of Orlando, Charlotte, Los Angeles, Ohio hub and others. Data specific to population changes and wastewater flow impacts due to the addition of a HSR was extremely limited with the exception of a study performed by the California State University. A California State University, Los Angeles report by Philip J. Romero, Ph. D, “*Unlocking the Gridlock in Los Angeles County’s Transportation System: The Local Economic Benefits of High-Speed Rail*”, October 8, 2008, included a study for population shifts due to HSR. Similar to the interconnection that would be seen by the Orlando – Tampa – St Petersburg HSR; the California study also included several neighboring counties that would be interconnected through HSR. The population shifts noted in the study were utilized to estimate the potential wastewater impacts to the City due to a HSR system implementation.

Potential impacts noted in this study that would be applicable to wastewater flows were two-fold. The first being an increase in the number of permanent residents moving into the City and utilizing the HSR to commute to work outside of the City and the second an increase in the number of employees commuting into the City from other areas due to job growth combined with the eased commute via HSR. This study provided data for increases in population and increases in employment within various southern California counties due to HSR implementation.

The average increase to population projections due to HSR was shown to be 0.49% excluding one county which actually showed a population reduction. The average increase in the number of employees per county was 0.83% with the exclusion of one county which actually showed a reduction in the number of employees.

The population projections presented in the 201 Facilities Plan, CDM, April 2010 were used as the basis for estimation of the HSR impact analysis with the exception that seasonal residents were excluded since the HSR would likely impact growth on the number of permanent residents. The population projections were increased by 0.49% to determine the potential added number of permanent residents. This value was then multiplied by the level of service standards presented in the 201 Facilities Plan, CDM, April 2010 in terms of gallons per capita per day (gcpd) for each WRF service area. **Table 2-3** provides a summary of this data showing the number of additional potential permanent residents and the associated potential increase in flow to the WRFs per service area.

For the California counties evaluated in the study, the number of employees was equal to approximately 50 percent of the number of residents. To estimate the number of employees for each of the WRF service areas, the number of projected permanent residents per WRF service area presented in Table 2-3 was multiplied by 50 percent. The number of projected employees was increased by 0.83% to determine the potential added number of employees due to HSR. This value was then multiplied by the per capita daily flows for each WRF service area. **Table 2-4** provides a summary of this data showing the number of additional potential employees and the associated potential increase in flow to the WRFs per service area.

The resulting increased flow projections after the addition of potential impacts due to HSR shown in Tables 2-3 and 2-4 were added to those resulting from projected growth shown in Table 2-2 starting in the year 2020 and these total projected flows are presented in **Table 2-5**.

**Table 2-3. Potential Increases in Permanent Residents and Flows due to HSR**

Year	Projected Permanent Residents <sup>1</sup>	Increase in Permanent Residents due to HSR (0.49% Increase)	Number of Added Permanent Residents due to HSR	Level of Service Standards (gcpd) <sup>1</sup>	Potential Additional Flow (gpd)	Potential Additional Flow (MGD)
<b>Albert Whitted WRF</b>						
2020	47,112	47,345	233	120	27,921	0.03
2025	47,564	47,799	235	120	28,189	0.03
2030	47,936	48,173	237	120	28,409	0.03
<b>Northeast WRF</b>						
2020	81,622	82,025	403	100	40,311	0.04
2025	82,026	82,431	405	100	40,510	0.04
2030	82,348	82,755	407	100	40,669	0.04
<b>Northwest WRF</b>						
2020	76,329	76,706	377	118	44,482	0.04
2025	76,416	76,793	377	118	44,533	0.04
2030	76,483	76,861	378	118	44,572	0.04
<b>Southwest WRF</b>						
2020	95,828	96,301	473	95	44,960	0.04
2025	96,285	96,761	476	95	45,175	0.05
2030	96,679	97,156	477	95	45,360	0.05

Note:

1. Data taken from the 201 Facilities Plan, CDM, April 2010

**Table 2-4. Potential Increases in Employees and Flows due to HSR**

Year	Estimated Number of Employees (50% of Permanent Residents)	Increased Employees due to HSR (0.83% Increase)	Number of Added Employees due to HSR	Per Capita Daily Flows	Potential Additional Flow (gpd)	Potential Additional Flow (MGD)
<b>Albert Whitted WRF</b>						
2020	23,556	23,752	196	120	23,557	0.02
2025	23,782	23,980	198	120	23,783	0.02
2030	23,968	24,168	200	120	23,969	0.02
<b>Northeast WRF</b>						
2020	40,811	41,151	340	100	34,011	0.03
2025	41,013	41,355	342	100	34,180	0.03
2030	41,174	41,517	343	100	34,314	0.03
<b>Northwest WRF</b>						
2020	38,165	38,483	318	118	37,531	0.04
2025	38,208	38,526	318	118	37,573	0.04
2030	38,242	38,560	319	118	37,606	0.04
<b>Southwest WRF</b>						
2020	47,914	48,313	399	95	37,934	0.04
2025	48,143	48,544	401	95	38,115	0.04
2030	48,340	48,742	403	95	38,271	0.04

Note:

1. Based on Permanent Resident Projections included in the 201 Facilities Plan, CDM, April 2010

**Table 2-5. Flow Projections with NEWRF Planned Developments and Potential HSR Impacts**

Year	Projected AADF Flows (MGD)			
	AWWRF	NEWRF	NWWRF	SWWRF
2010	5.93	9.85	9.96	9.81
2015	6.02	11.33	10.00	9.89
2020	<b>6.14</b>	<b>11.47</b>	<b>10.09</b>	<b>10.02</b>
2025	<b>6.20</b>	<b>11.53</b>	<b>10.10</b>	<b>10.08</b>
2030	<b>6.25</b>	<b>11.57</b>	<b>10.11</b>	<b>10.12</b>

For years 2020 through 2030, the following increases due to HSR impacts are reflected in Table 5:

- AWWRF - increased by .05 MGD (.03 residential / .02 employee)
- NEWRF - increased by .07 MGD (.04 residential / .03 employee)
- NWWRF - increased by .08 MGD (.04 residential / .04 employee)
- SWWRF - increased by .08 MGD for year 2020 (.04 residential / .04 employee)
- SWWRF - increased by .09 MGD for years 2025 and 2030 (.05 residential / .04 employee)

Although the projected flow for the AWWRF in 2030 presented in Table 2-5 is projected at 6.25 MGD, the flow diversion alternatives evaluated in Section 3 of this report assume a required flow diversion of 7.0 MGD. The additional flow (0.75 MGD) was added to provide additional conservatism for any unforeseen additional flows that may occur in the future.

### 2.1.3 Peaking Factors

Recent City projects have focused on providing a reduction for infiltration and inflow (I&I) which occur during wet weather events and affect the peaking factors. Plans by the City include a continued effort to target projects which can provide additional reduction in I&I which may lead to reduced peaking factors. Due to this recent effort and resulting reduction in peaking factors, data used to determine future peaking factors were limited to the past 5 years.

The 201 Facilities Plan, CDM, April 2010 provided annual average peaking factors using data from 2005 through 2009 for each WRF. The annual average day peaking factors per WRF over this time period are presented in **Table 2-6**. Variation in peaking factors noted between years and between facilities may be due to varying stages of I&I repair efforts. Additional investigation may be warranted during the design phase for flow diversion alternatives, if selected.

**Table 2-6. Average Peaking Factors for 2005 – 2009**

Year	Annual Average Day Peaking Factors			
	AWWRF	NEWRF	NWWRF	SWWRF
2005	2.4	2.4	3.1	3.2
2006	2.9	2.7	3.3	3.9
2007	3.3	3.7	2.6	3.6
2008	2.8	3.8	2.8	3.7
2009	3.5	2.5	3.1	3.2
<b>Overall Average</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>3.5</b>

The flow diversion evaluations presented in this memo will be diverting flow from the AWWRF conveyance system and therefore the overall average peaking factor of 3.0 was used.

## 2.2 Remaining Available Treatment Capacity

Table 2-7 provides a summary of Florida Department of Environmental Protection (FDEP) permitted capacities for each WRF. Table 2-8 presents the remaining treatment capacities for each WRF calculated by subtracting the total potential flow projections presented in Table 2-5 from the permitted treatment capacities presented in Table 2-7.

**Table 2-7. FDEP Permitted Capacities**

Facility	AWWRF	NEWRF	NWWRF	SWWRF
FDEP Permitted Treatment Capacities (MGD AADF)	12.4	16.0	20.0	20.0

**Table 2-8. Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)			
	AWWRF	NEWRF	NWWRF	SWWRF
2010	6.47	6.15	10.04	10.19
2015	6.38	4.67	10.00	10.11
2020	6.26	4.53	9.91	9.98
2025	6.20	4.47	9.90	9.92
2030	6.15	4.43	9.89	9.88

The NEWRF is projected to have the least amount of remaining capacity at 27 percent at the end of the study period while the three other WRFs will have approximately 50 percent remaining capacity.

Flow diversion alternatives presented in Section 3 of this report evaluate diversion to a single WRF as well as flow splits between two WRFs (splitting flows among all three remaining WRFs was not considered). Because the projected remaining capacity for the NEWRF is less than the anticipated flows needing diversion, NEWRF was not evaluated as an alternative for diversion to a single WRF.

# Section 3

## Flow Diversion Alternatives Development

Based on the remaining available capacities at each WRF which were developed in Section 2, multiple flow diversion alternatives were developed from which two final flow diversion alternatives, based on cost and operational flexibility, were selected. Portions of the information included in this section were previously presented to the City in the *Flow Diversion Alternatives Memorandum*, CDM, July 2, 2010.

### 3.1 Approach Utilized

The flow diversion alternatives were prepared based on the information collected utilizing previous reports, the 201 Facilities Plan, CDM, April 2010, permitted capacities for the water reclamation facilities, data provided by the City (**Appendix A**), and flow conveyance meetings with City staff. For each flow diversion alternative, a proposed route and a conceptual level marginal cost estimate for construction was prepared by CDM Constructors, Inc. for comparison purposes.

For each of the flow diversion alternatives a master pump station would be installed in the vicinity of the influent junction box for the AWWRF and discharge through force mains to the other WRFs. Flow diversion alternatives evaluated diversion to a single WRF as well as flow splits between two WRFs (splitting flows among all three remaining WRFs was not considered). Because the projected remaining capacity for the NEWRF is less than the anticipated flows needing diversion, NEWRF was not evaluated as an alternative for diversion to a single WRF. A maximum peak velocity of 5 feet per second (fps) was targeted for pipe size selection. Percentage flow splits were targeted, however the calculated flow splits based on nominal pipe diameters and friction losses are presented. For ease of operation, the flow split was calculated based on a path of least resistance rather than active split control through valving.

For each flow diversion alternative, a description of the alternative is provided along with a conceptual level cost estimate for the force main based on a unit price per linear foot (lf) of force main and a conceptual marginal cost estimate for the pump station which included pumps, electrical equipment, and installation. Cost estimates for pipelines were based on ductile iron piping (DIP) installed via open cut and include fittings, excavation, backfill, and dewatering. A separate cost for pavement restoration is also included.

An estimate of the cost of the pump station structure was not performed because it will be the same for all alternatives. The size of the pumps and associated electrical requirements will vary based on the horsepower (hp) requirements for each alternative. Costs for pumps (2 duty; 1 standby) with installation based on required hp and associated electrical costs are included for each alternative option. Calculations for required minimum brake hp assumed a pump efficiency of 70 percent and are based on the estimated peak flow total head loss for each alternative.

All costs presented in this section include the following mark-ups:

- General Conditions – 8%
- Escalation – 4%
- Overhead & Profit – 12%
- Contingency – 25%

Although the projected flow for the AWWRF in 2030 previously shown in Section 2 is projected at 6.25 MGD, the following flow diversion alternatives assume a required flow diversion of 7.0 MGD. The additional flow (0.75 MGD) was added to provide additional conservatism for any unforeseen additional flows that may occur in the future.

### 3.2 Alternative #1 – Southwest WRF Only

Alternative #1 directs all diverted flow to the Southwest WRF. Force main routing and sizing is presented in **Figure 3-1** with conceptual cost estimates for the force main and pump cost provided in **Table 3-1**. The total minimum required peak flow brake hp for this alternative is approximately 350 hp.

**Table 3-1. Alternative #1 Conceptual Marginal Cost Estimate**

Item	Quantity (lf) <sup>1</sup>	Cost per lf <sup>2</sup>	Total Cost
36-inch DIP	33,050	\$472.53	\$15,617,117
Pavement Restoration (36")	33,050	\$53.72	\$1,775,446
Pumps (2 duty;1 standby)	\$485,760		
<b>Total Marginal Cost</b>	<b>\$17,878,323</b>		

Notes:

1. Force main quantities were estimated using Google Earth Pro.
2. Costs estimated by CDM Constructors, Inc. per assumptions noted.

The estimated remaining capacity for the SWWRF due to flow diversion Alternative #1 is presented in **Table 3-2**. These values were calculated by subtracting the 7 MGD AWWRF flow diversion from the SWWRF remaining capacity values shown in Table 2-8.



Figure 3-1  
 Alternative 1 – Southwest WRF Only  
 Albert Whitted Reclamation Facility (AWWRF) Evaluation of Operation Alternatives  
 St. Petersburg, FL

**Table 3-2. Alternative #1 - Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)		
	NEWRF	NWWRF	SWWRF
2010	6.15	10.04	3.19
2030	4.43	9.89	2.88

### 3.3 Alternative #2 – Northwest WRF Only

Alternative #2 directs all diverted flow to the Pasadena LS to be pumped to the Northwest WRF. Based on historical data received from the City, Pasadena LS has a peak hour flow of approximately 13.4 MGD. Pasadena LS currently discharges through approximately 12,500 lf of 36" diameter force main.

With a combined peak hour flow of 34.4 MGD (21 MGD from diverted flow and 13.4 MGD from current Pasadena LS peak hour flow), a parallel 24" force main would be required. Force main routing and sizing is presented in **Figure 3-2** with conceptual cost estimates for the force main and marginal pump costs provided in **Table 3-3**. Additionally, this alternative includes the cost for additional pumping capacity required at Pasadena LS.

The total minimum required peak flow brake hp for this alternative is approximately 510 hp.

**Table 3-3. Alternative #2 Conceptual Marginal Cost Estimate**

Item	Quantity (lf) <sup>1</sup>	Cost per lf <sup>2</sup>	Total Cost
36-inch DIP	35,420	\$472.53	\$16,737,013
Pavement Restoration (36")	35,420	\$53.72	\$1,902,762
24-inch DIP	12,500	\$248.51	\$3,106,375
Pavement Restoration (24")	12,500	\$46.06	\$575,750
Pasadena LS Additional Pumps <sup>3</sup>	\$121,440		
Pumps (2 duty;1 standby)	\$541,999		
<b>Total Marginal Cost</b>	<b>\$22,985,339</b>		

Notes:

1. Force main quantities were estimated using Google Earth Pro.
2. Costs estimated by CDM Constructors, Inc. per assumptions noted.
3. Cost is for pumps and motors only and does not include potential modifications required at the Pasadena Pump Station to install additional pumps.

The estimated remaining capacity for the NWWRF due to flow diversion Alternative #2 is presented in **Table 3-4**. These values were calculated by subtracting the 7 MGD AWWRF flow diversion from the NWWRF remaining capacity values shown in Table 2-8.

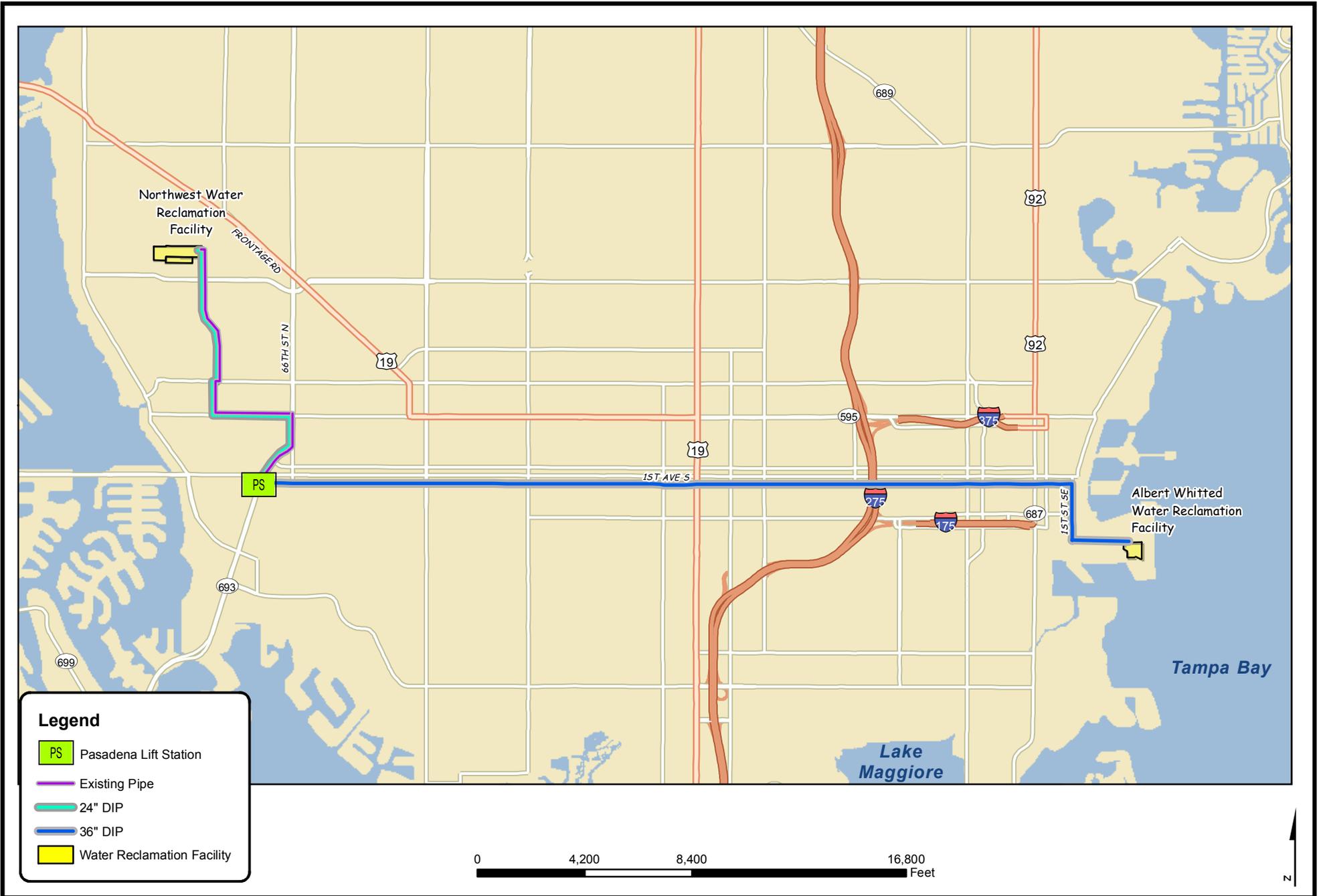


Figure 3-2  
 Alternative 2 – Northwest WRF Only  
 Albert Whitted Reclamation Facility (AWWRF) Evaluation of Operation Alternatives  
 St. Petersburg, FL

**Table 3-4. Alternative #2 - Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)		
	NEWRF	NWWRF	SWWRF
2010	6.15	3.04	10.19
2030	4.43	2.89	9.88

### 3.4 Alternative #3 – Northwest & Southwest WRF Split (47%/53%)

Alternative #3 splits the diverted flow by sending 3.69 MGD to the Pasadena LS (discharging to Northwest WRF) and sending 3.31 MGD directly to the Southwest WRF. Based on the velocity requirement and the historical peak hour flow of 13.4 MGD at Pasadena LS, the proposed 36" force main has sufficient capacity. Force main routing and sizing is presented in **Figure 3-3** with conceptual marginal cost estimates for the force main and pump cost provided in **Table 3-5**. Additionally, this alternative includes the marginal cost for additional pumping capacity required at Pasadena LS.

The total minimum required peak flow brake hp for this alternative is approximately 755 hp.

**Table 3-5. Alternative #3 Conceptual Marginal Cost Estimate**

Item	Quantity (lf) <sup>1</sup>	Cost per lf <sup>2</sup>	Total Cost
36-inch DIP	15,830	\$472.53	\$7,480,150
Pavement Restoration (36")	15,830	\$53.72	\$850,388
24-inch DIP	43,570	\$248.51	\$10,827,581
Pavement Restoration (24")	43,570	\$46.06	\$2,006,834
Pasadena LS Additional Pumps <sup>3</sup>	\$194,304		
Pumps (2 duty;1 standby)	\$1,232,922		
<b>Total Marginal Cost</b>	<b>\$22,592,179</b>		

Notes:

1. Force main quantities were estimated using Google Earth Pro.
2. Costs estimated by CDM Constructors, Inc. per assumptions noted.
3. Cost is for pumps and motors only and does not include potential modifications required at the Pasadena Pump Station to install additional pumps.

The estimated remaining capacity for the NWWRF and SWWRF due to flow diversion Alternative #3 is presented in **Table 3-6**. Values were calculated by subtracting the 3.23 MGD and the 3.77 MGD flow diversions from the NWWRF and SWWRF respectively from the remaining capacity values shown in Table 2-8. This same procedure was followed for the remaining alternative evaluations.

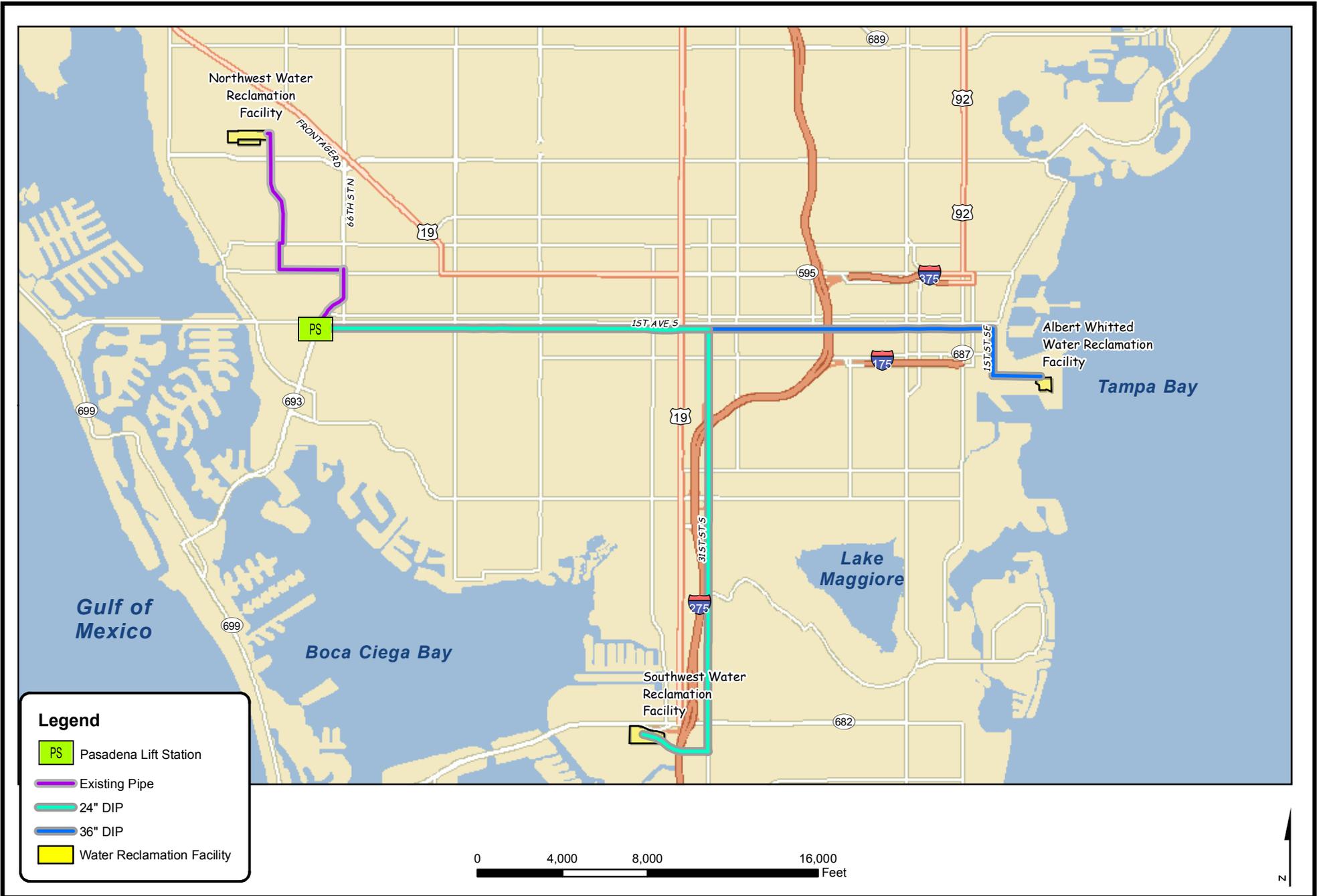


Figure 3-3  
 Alternative 3 – Northwest - Southwest WRF Split (47%, 53%)  
 Albert Whitted Reclamation Facility (AWWRF) Evaluation of Operation Alternatives  
 St. Petersburg, FL

**Table 3-6. Alternative #3 - Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)		
	NEWRF	NWWRF	SWWRF
2010	6.15	6.35	6.88
2030	4.43	6.20	6.57

### 3.5 Alternative #4 - Northwest & Southwest WRF Split (28%/72%)

Alternative #4, a variation of Alternative #3, splits the diverted flow by sending 1.93 MGD to the Pasadena LS (discharging to Northwest WRF) and 5.07 MGD directly to the Southwest WRF. Based on the velocity requirement and the historical peak hour flow of 13.4 MGD at Pasadena LS, the proposed 36" force main has sufficient capacity. Force main routing and sizing is presented in **Figure 3-4** with conceptual marginal cost estimates for the force main and pump marginal cost provided in **Table 3-7**. Additionally, this alternative includes the marginal cost for additional pumping capacity required at Pasadena LS.

The total minimum required peak flow brake hp for this alternative is approximately 470 hp.

**Table 3-7. Alternative #4 Conceptual Marginal Cost Estimate**

Item	Quantity (lf) <sup>1</sup>	Cost per lf <sup>2</sup>	Total Cost
36-inch DIP	15,830	\$472.53	\$7,480,150
Pavement Restoration (36")	15,830	\$53.72	\$850,388
30-inch DIP	23,990	\$354.52	\$8,504,935
Pavement Restoration (30")	23,990	\$49.86	\$1,196,141
20-inch DIP	19,580	\$195.00	\$3,818,100
Pavement Restoration (20")	19,580	\$45.86	\$897,939
Pasadena LS Additional Pumps <sup>3</sup>	\$145,728		
Pumps (2 duty;1 standby)	\$541,999		
<b>Total Marginal Cost</b>	<b>\$23,435,380</b>		

Notes:

1. Force main quantities were estimated using Google Earth Pro.
2. Costs estimated by CDM Constructors, Inc. per assumptions noted.
3. Cost is for pumps and motors only and does not include potential modifications required at the Pasadena Pump Station to install additional pumps.

The estimated remaining capacity for the NWWRF and SWWRF due to flow diversion Alternative #4 is presented in **Table 3-8**.

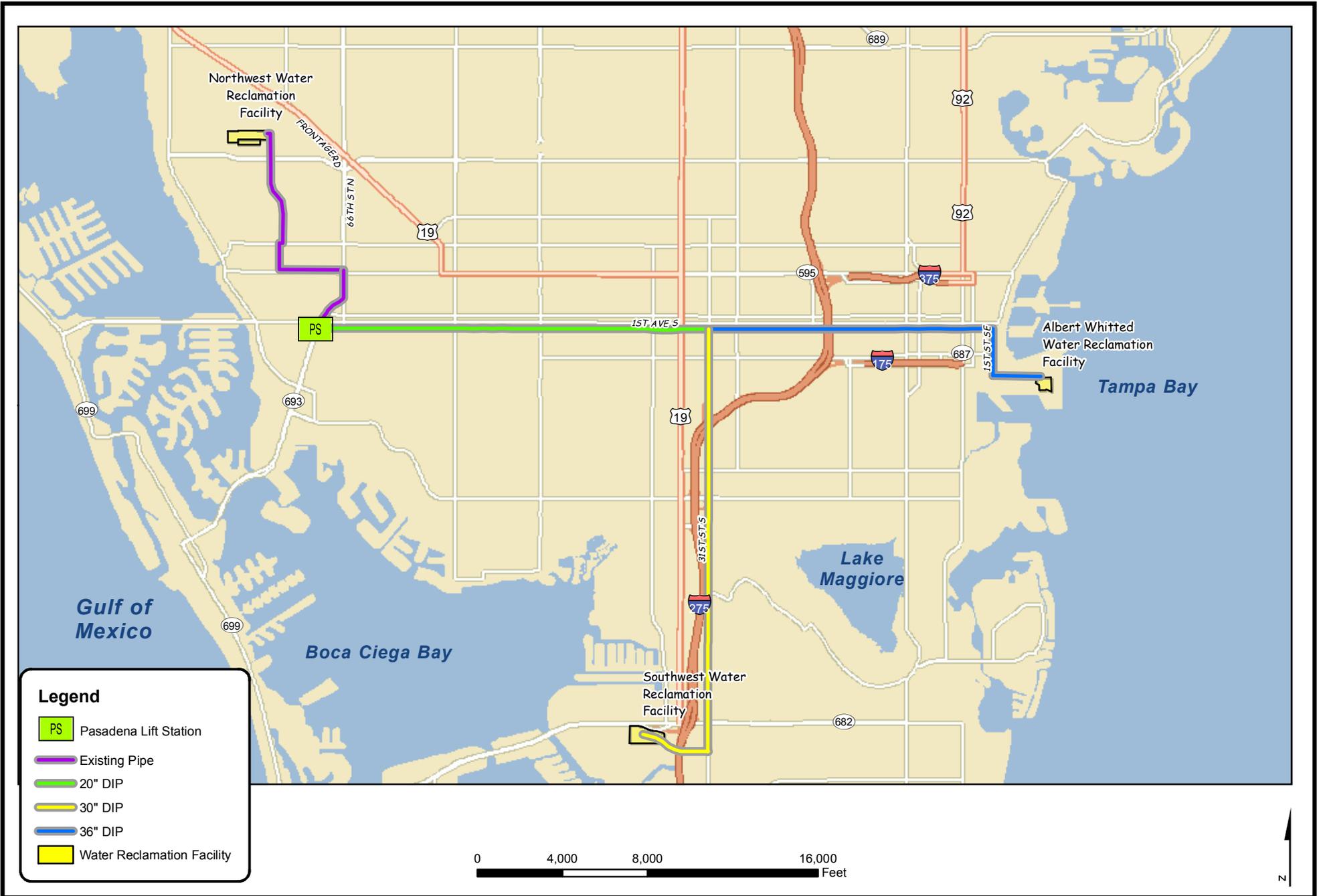


Figure 3-4  
 Alternative 4 – Northwest - Southwest WRF Split (28%, 72%)  
 Albert Whitted Reclamation Facility (AWWRF) Evaluation of Operation Alternatives  
 St. Petersburg, FL

**Table 3-8. Alternative #4 - Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)		
	NEWRF	NWWRF	SWWRF
2010	6.15	<b>8.11</b>	<b>5.12</b>
2030	4.43	<b>7.96</b>	<b>4.81</b>

### 3.6 Alternative #5 - Southwest & Northeast WRF Split (49%/51%)

Alternative #5 splits the diverted flow by sending 3.41 MGD to the Southwest WRF and 3.59 MGD to the Northeast WRF. Force main routing and sizing is presented in **Figure 3-5** with conceptual marginal cost estimates for the force main and pump cost provided in **Table 3-9**. The total minimum required peak flow brake hp for this alternative is approximately 670 hp.

**Table 3-9. Alternative #5 Conceptual Marginal Cost Estimate**

Item	Quantity (lf) <sup>1</sup>	Cost per lf <sup>2</sup>	Total Cost
24-inch DIP	63,110	\$248.51	\$15,683,466
Pavement Restoration	63,110	\$46.06	\$2,906,847
Pumps (2 duty;1 standby)	\$520,283		
<b>Total Marginal Cost</b>	<b>\$19,110,596</b>		

Notes:

1. Force main quantities were estimated using Google Earth Pro.
2. Costs estimated by CDM Constructors, Inc. per assumptions noted.

The estimated remaining capacity for the SWWRF and NEWRF due to flow diversion Alternative #5 is presented in **Table 3-10**.

**Table 3-10. Alternative #5 - Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)		
	NEWRF	NWWRF	SWWRF
2010	<b>2.56</b>	10.04	<b>6.78</b>
2030	<b>0.84</b>	9.89	<b>6.47</b>

### 3.7 Alternative #6 - Southwest & Northeast WRF Split (63%/37%)

Alternative #6, a variation of Alternative #5, splits the diverted flow by sending 4.41 MGD to the Southwest WRF and 2.59 MGD to the Northeast WRF. Force main routing and sizing is presented in **Figure 3-6** with conceptual marginal cost estimates for the





Figure 3-6  
 Alternative 6 – Southwest - Northeast WRF Split ( 63%, 37%)  
 Albert Whitted Reclamation Facility (AWWRF) Evaluation of Operation Alternatives  
 St. Petersburg, FL

force main and pump marginal cost provided in **Table 3-11**. The total minimum required peak flow brake hp for this alternative is approximately 365 hp.

**Table 3-11. Alternative #6 Conceptual Marginal Cost Estimate**

Item	Quantity (lf) <sup>1</sup>	Cost per lf <sup>2</sup>	Total Cost
30-inch DIP	33,060	\$354.52	\$11,720,431
Pavement Restoration (30")	33,060	\$49.86	\$1,648,372
24-inch DIP	30,050	\$248.51	\$7,467,726
Pavement Restoration (24")	30,050	\$46.06	\$1,384,103
Pumps (2 duty;1 standby)	\$485,760		
<b>Total Marginal Cost</b>	<b>\$22,706,392</b>		

Notes:

1. Force main quantities were estimated using Google Earth Pro.
2. Costs estimated by CDM Constructors, Inc. per assumptions noted.

The estimated remaining capacity for the SWWRF and NEWRF due to flow diversion Alternative #6 is presented in **Table 3-12**.

**Table 3-12. Alternative #6 - Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)		
	NEWRF	NWWRF	SWWRF
2010	3.56	10.04	5.78
2030	1.84	9.89	5.47

### 3.8 Alternative #7 - Northwest & Northeast WRF Split (62%/38%)

Alternative #7 splits the diverted flow by sending 4.34 MGD to the Pasadena LS which pumps to Northwest WRF and 2.66 MGD to the Northeast WRF. The proposed 36" force main has sufficient hydraulic capacity to meet the velocity criteria with the existing peak hour flow and the portion of diverted flow. Force main routing and sizing is presented in **Figure 3-7** with conceptual marginal cost estimates for the force main and pump marginal cost provided in **Table 3-13**. Additionally, this alternative includes the cost for additional pumping capacity required at Pasadena LS.

The total minimum required peak flow brake hp for this alternative is approximately 450 hp.

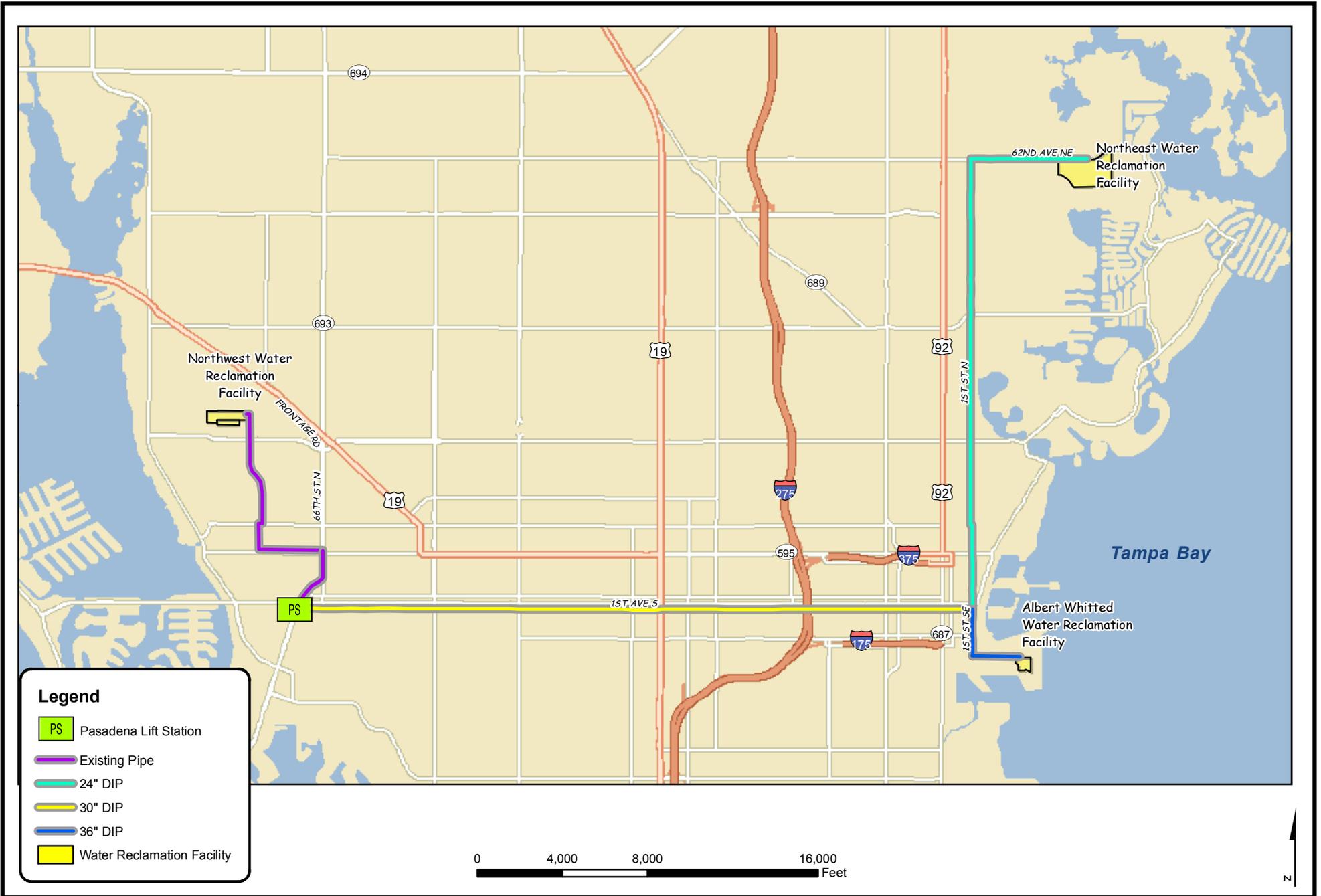


Figure 3-7  
 Alternative 7 – Northwest - Northeast WRF Split ( 62%, 38%)  
 Albert Whitted Reclamation Facility (AWWRF) Evaluation of Operation Alternatives  
 St. Petersburg, FL

**Table 3-13. Alternative #7 Conceptual Marginal Cost Estimate**

Item	Quantity (lf) <sup>1</sup>	Cost per lf <sup>2</sup>	Total Cost
36-inch DIP	2,980	\$472.53	\$1,408,139
Pavement Restoration (36")	2,980	\$53.72	\$160,086
30-inch DIP	32,430	\$354.52	\$11,497,084
Pavement Restoration (30")	32,430	\$49.86	\$1,616,960
24-inch DIP	27,070	\$248.51	\$6,727,166
Pavement Restoration (24")	27,070	\$46.06	\$1,246,844
Pasadena LS Additional Pumps	\$242,880		
Pumps (2 duty;1 standby)	\$541,999		
<b>Total Marginal Cost</b>	<b>\$23,441,158</b>		

Notes:

1. Force main quantities were estimated using Google Earth Pro.
2. Costs estimated by CDM Constructors, Inc. per assumptions noted.

The estimated remaining capacity for the NWWRF and NEWRF due to flow diversion Alternative #7 is presented in **Table 3-14**.

**Table 3-14. Alternative #7 - Estimated Remaining Treatment Capacities**

Year	Estimated Remaining Treatment Capacities (MGD)		
	NEWRF	NWWRF	SWWRF
2010	3.49	5.70	10.19
2030	1.77	5.55	9.88

### 3.9 Summary

A summary of results for each alternative are presented in **Table 3-15**.

Recommendations provided in the *Flow Diversion Alternatives Memorandum*, CDM, July 2, 2010, included selection of Alternative #1 (SWWRF Only) which showed the lowest marginal construction cost, and Alternative #3 (NWWRF & SWWRF) because the available capacity at all three WRFs in 2030, following diversion of flows, provides a higher amount of buffering against future unanticipated flows, in this alternative. The City concurred with the recommendation and selected flow diversion Alternative #1, Southwest WRF Only, and Alternative #3, Northwest (Pasadena) & Southwest WRF Split (47%/53%), for the detailed comparison.

A more detailed cost analysis for the two selected flow diversion alternatives and the keep AWWRF operational alternative is developed in Section 4 of this report.

**Table 3-15. Alternative Evaluations Summary Table**

Alternative	Description	Marginal Construction Cost (\$)	Estimated Remaining Treatment Capacities for 2030 (MGD)		
			NEWRF	NWWRF	SWWRF
Alternative #1	Southwest WRF Only	\$17,878,323	4.43	9.89	2.88
Alternative #2	Northwest WRF Only	\$22,985,339	4.43	2.89	9.88
Alternative #3	Northwest & Southwest WRF Split (47%/53%)	\$22,592,179	4.43	6.20	6.57
Alternative #4	Northwest & Southwest WRF Split (28%/72%)	\$23,435,380	4.43	7.96	4.81
Alternative #5	Southwest & Northeast WRF Split (49%/51%)	\$19,110,596	0.84	9.89	6.47
Alternative #6	Southwest & Northeast WRF Split (63%/37%)	\$22,706,392	1.84	9.89	5.47
Alternative #7	Northwest & Northeast WRF Split (62%/38%)	\$23,441,158	1.77	5.55	9.88

# Section 4

## Capital and O&M Costs for Selected Alternatives

### 4.1 Introduction

This section of the report provides an evaluation of the potential marginal costs that may be incurred for each of the three alternatives:

- Albert Whitted Water Reclamation Facility (AW WRF) Operational – Keep AWWRF in operation. This represents the existing scenario. In order to keep AWWRF operational, additional costs will be incurred for new reject water storage required by regulations (off-site storage may be the only viable alternative and will include pumping, piping, land acquisition, storage tank etc.), as well as, for general facility upkeep pertaining to equipment and structure.
- Flow Diversion to Southwest Water Reclamation Facility (SWWRF) – Divert (pump) AWWRF flow to SWWRF and take AWWRF out-of-service. This alternative is detailed in Section 3.
- Flow Diversion to SWWRF and Northwest Water Reclamation Facility (NWWRF) – Divert (pump) AWWRF flow to SWWRF and NWWRF and taken AWWRF out-of-service. This alternative is detailed in Section 3.

The marginal costs evaluated in this section include capital costs for new construction, rehabilitation and/or replacement costs of equipment, and operations and maintenance costs, as would be incurred for each of the three selected alternatives within the twenty year (October 2010 through September 2030) study period. Cost information and data used for costing which were provided by the City are included as **Appendix A** of this report.

### 4.2 New Construction Marginal Capital Costs

The following sections will present the marginal capital costs associated with the required new construction for each of the three alternatives. All conceptual level capital cost estimates include the allowances for indirect costs presented in **Table 4-1**. Cost estimates for required new capital were prepared by CDM Constructors, Inc. and are included as **Appendix B** of this report.

**Table 4-1. Allowances Applied to New Capital Costs**

Allowances for Indirect Costs	Percentage or Amount Allocated
Maintenance of Traffic	1.00%
Painting	1.00%
Sales Tax	7.00%
Builders Risk Insurance	1.50%
General Liability Insurance	1.00%
Bonds	1.50%
General Conditions	10.00%
Contractor Overhead and Profit	10.00%
Construction Contingency	25.00%
Engineering Fees	
Flow Conveyance Piping	12%
Pump Stations, Demolition, Misc. Piping	15%
Permits	
Reject Pump Station	\$35,000
SWWRF Only Flow Diversion Alternative	\$100,000
SWWRF and NWWRF Flow Diversion Alternative	\$150,000

### 4.2.1 Keep AWWRF Operational Alternative

The AWWRF currently occupies approximately 8.9 acres of leased property located on the Albert Whitted Municipal Airport property currently owned by the City of St Petersburg. It is bordered to the north by an airport taxi way, to the east by a runway, to the south by U.S. Coast Guard offices, and to the west by airplane hangars. The facility currently does not have a dedicated reject water storage tank. In order for the facility to be compliant with current Florida Department of Environmental Protection (FDEP) regulations, a 7 million gallon (MG) reject tank would need to be constructed. As shown in **Figure 4-1**, the on-site space constraints preclude the siting of new reject storage tank(s) at the current location of AWWRF. In addition to the tight site constraints, the existing site must also be sensitive to height limitations due to the proximity to the existing runways.



Figure 4-1. Current AWWRF Site

In order to facilitate the 7 MG reject tank, an available off-site parcel of property was located by the City to accommodate the new construction. The parcel is a 15 acre vacant mobile home park, located between 30th Avenue South and 32nd Avenue South west of 4th Street South. The purchase price for this parcel is estimated at \$4,900,000 (Appendix A). If the City decides to pursue a property purchase to accommodate construction of reject water storage tanks, it may be possible to locate a less expensive parcel of suitable property at that time.

To estimate potential costs associated with a new reject water tank and pump station a conceptual level design was completed. Conceptual level construction costs include the new 7 MG reject storage tank which would be located at the remote location, a pump station at the AWWRF to include two, 200 hp pumps (1 duty, 1 standby), 20-inch DI piping from the AWWRF to the reject storage tank, 6-inch DI piping from the reject storage tank to the nearest gravity collection system to allow for return of the reject water to the AWWRF, and associated electrical and instrumentation costs. The conceptual level cost estimates, including the allowances for indirect costs presented in Table 4-1, are presented in **Table 4-2**. However, no allowances for indirect costs were added for the required new property acquisition.

**Table 4-2. Keep AWWRF Operation Alternative Conceptual Level Marginal Cost Estimate for New Capital Costs**

Item	Estimate Cost in 2010 \$
Piping and Site Work	\$4,700,000
Reject Storage Tank (7 MG)	\$4,300,000
Pumps, Instrumentation, and Electrical	\$580,000
<b>Subtotal</b>	<b>\$9,580,000</b>
New Land Acquisition (No Allowances Added)	\$4,900,000
<b>Total</b>	<b>\$14,480,000</b>

This marginal conceptual cost estimate assumes that new pumps will be required at the AWWRF to pump the reject water to the off-site storage tank. However, the potential to utilize some of the existing pumps on-site at the AWWRF may be explored during further design of this alternative. If existing pumps were to be utilized, a deduction of approximately \$200,000 could be made from the total estimated cost of \$14,480,000 presented in Table 4-2.

#### **4.2.2 SWWRF Only Flow Diversion Alternative**

For the SWWRF Only Flow Diversion Alternative, all flow would be directed to the SWWRF via a new pump station located in proximity of the existing AWWRF. To estimate potential marginal costs associated with a new flow diversion pump station a conceptual level design was completed. Conceptual level (new) marginal capital construction costs include a new pump station and all associated piping, conveyance piping to the SWWRF, electrical, and instrumentation costs. Elements and considerations incorporated into the pump station conceptual design based on input received from the City (and, therefore, related cost) include the following:

- Construction of a wet pit / dry pit design with stairs, railings, and fencing
- Three, 215 hp pumps (two duty, one standby) to convey a peak flow of 21 MGD. Preliminary pump selection was based on the total minimum required hp of 350 provided in Section 3 of this report.
- Variable Frequency Drives (3), Switchgear, Transformer, Generator, and Electrical Enclosure
- Programmable Logic Control (PLC), Control Panels, and SCADA Interface
- Influent channel with a grinder unit and manual screening for peak overflow
- Odor control system

Also included in the conceptual level cost estimate was an estimated cost associated with modifications to the gravity pipes that currently feed into the AWWRF influent pump station. For development of these costs, it was assumed that the new pump station would be located within the airport property or in proximity to the existing location of the AWWRF.

If flow is diverted to the SWWRF, and the AWWRF treatment trains are taken out of service, the City would retain the two existing injection wells, associated monitoring wells, and the existing Reclaimed Water Aquifer Recovery on Demand “REWARD” withdrawal well all of which are located on the AWWRF site. The injection wells can continue to be utilized through the existing reclaimed water system and no new capital construction costs are currently anticipated with either the injection wells or the monitoring wells. To maintain use of the REWARD well, new capital costs would include piping for transmission of flow to the new diversion pump station using the existing pumps at the REWARD well. The potential costs associated with connection of the REWARD well to the flow diversion pump station are included in the conceptual level cost estimates.

All other structures at the AWWRF not required for the continued use of the injection, monitoring, and REWARD well would be demolished. A conceptual cost for demolition has been included for this alternative. The existing 2MG reclaimed water storage tank at the AWWRF would be demolished, however, in order to maintain the same total (regional) above-ground reclaimed water storage capacity, estimated cost for addition of this capacity (storage tank) at the SWWRF is also included. City has verified that sufficient space for this construction is currently available at the SWWRF.

The marginal conceptual level cost estimates for flow diversion to SWWRF Only with the allocated mark-ups previously presented in Table 4-1 are presented in Table 4-3.

**Table 4-3. Flow Diversion to SWWRF Only – Conceptual Marginal Cost Estimate for New Capital Costs**

Item	Estimate Cost in 2010 \$
Pump Station – Structure and Site Work	\$2,100,000
Pump Station – Mechanical, Instrumentation, and Electrical	\$3,800,000
<b>Subtotal</b>	<b>\$5,900,000</b>
Piping for Conveyance of Flows	\$21,200,000
<b>Subtotal</b>	<b>\$27,100,000</b>
Gravity Pipe Modifications	\$700,000
REWARD Well Conveyance Piping	\$100,000
<b>Subtotal</b>	<b>\$27,900,000</b>
Demolition of AWWRF	\$3,000,000
Replacement 2MG Reclaimed Water Storage Tank	\$1,725,000
<b>Total</b>	<b>\$32,625,000</b>

### 4.2.3 SWWRF and NWWRF Flow Diversion Alternative

For the flow diversion to SWWRF and NWWRF Alternative, flow would be split with approximately 3.31 MGD diverted to the SWWRF and 3.69 MGD diverted to the NWWRF via the Pasadena Pump Station by a new pump station located by the existing AWWRF. To estimate potential costs associated with a new flow diversion pump station a conceptual level design was completed. Conceptual level marginal construction costs include the new pump station and all associated piping, conveyance piping to the SWWRF and NWWRF, electrical, and instrumentation costs.

Elements and considerations incorporated into the pump station design based on input received from the City (and, therefore, related cost) include the following:

- Construction of a wet pit / dry pit design with stairs, railings, and fencing
- Three, 525 hp pumps (two duty, one standby) to convey a peak flow of 21 MGD. Preliminary pump selection was based on the total minimum required hp of 755 provided in Section 3 of this report.
- Variable Frequency Drives (3), Switchgear, Transformer, Generator, and Electrical Enclosure
- Programmable Logic Control (PLC), Control Panels, and SCADA Interface
- Influent channel with a grinder unit and manual screening for peak overflow
- Odor control system

This flow diversion alternative utilizes the existing Pasadena Pump Station. Flow would enter the existing pump station and then proceed from the pump station to the NWWRF through the existing 36-inch pipeline (Figure 3-3). It was determined that one additional pump, matching the existing pumps, would be required for the additional 3.69 MGD of flow. Costs associated with addition of one pump are included in the conceptual costs for this alternative.

As with the SWWRF Only flow diversion alternative, this alternative also includes conceptual level marginal cost estimates for the potential modifications to the gravity pipes that currently feed into the AWWRF influent pump station.

For this flow diversion alternative, the City would again retain the existing AWWRF injection wells, associated monitoring wells, and the existing REWARD well. The potential costs associated with connection of the REWARD well to the flow diversion pump station are included in the conceptual level cost estimates.

All other structures at the AWWRF not required for the continued use of the injection, monitoring, and REWARD well would be demolished. A conceptual cost for demolition has been included for this alternative. The existing 2MG reclaimed water storage tank at the AWWRF would be demolished, however, in order to maintain the same total (regional) above-ground reclaimed water storage capacity, estimated cost for addition of this capacity (storage tank) at the SWWRF is also included. City has verified that sufficient space for this construction is currently available at the SWWRF.

The conceptual level marginal cost estimates for the SWWRF and NWWRF flow diversion alternative with the allocated mark-up are presented in **Table 4-4**.

**Table 4-4. Flow Diversion to Swwrf and Nwwrf - Conceptual  
Marginal Cost Estimate for New Capital Costs**

Item	Estimate Cost in 2010 \$
Pump Station – Structure and Site Work	\$2,300,000
Pump Station – Mechanical, Instrumentation, and Electrical	\$5,600,000
<b>Subtotal</b>	<b>\$7,900,000</b>
Piping for Conveyance of Flows (Includes Pasadena Pump)	\$27,000,000
<b>Subtotal</b>	<b>\$34,900,000</b>
Gravity Pipe Modifications	\$700,000
REWARD Well Conveyance Piping	\$100,000
<b>Subtotal</b>	<b>\$35,700,000</b>
Demolition of Awwrf	\$3,000,000
Replacement 2MG Reclaimed Water Storage Tank	\$1,725,000
<b>Total</b>	<b>\$40,425,000</b>

### 4.3 Replacement and Rehabilitation (R&R)

To determine potential marginal costs associated with required R&R, the anticipated useful life for the various types of equipment and structures was determined through discussions with City operations staff and from CDM’s experience with similar facilities and assets. The resulting anticipated useful life for equipment and structures is presented in **Table 4-5**. For large items such as process structures, rehabilitation is typically performed as opposed to an actual demolition with replacement. Using the premise that the rehabilitation does not provide the same useful life as that for a new structure, it was determined through discussions with the City and the based on the City’s historical remaining useful life observed following rehabilitation in lieu of replacement, that the remaining useful life is decreased by 50 percent. The determined useful life as listed in Table 4-5 was decreased by 50 percent for any rehabilitated items.

**Table 4-5. Determined Useful Life for Wastewater Equipment and Structures**

Item Description	Expected Life (Years)
Tanks – Chemical Storage	5
Aerators	15
Belt Filter Press	15
Blowers	15
Clarifier Rakes and Drives	15
Compressors	15
Electrical (MCC, VFD, Transformers, etc.)	15
Flow Meters	15
Generators	15
Gravity Belt Thickener	15
Grit Collectors	15
Grit Separators	15
Instrumentation (PLC, SCADA, etc.)	15
Odor Control Systems	15
Pumps	15
Mixers	15
Motorized Equipment (Other)	15
Screening Equipment	15
Pump Stations	20
Buildings – Concrete Metal	20
Buildings – Concrete Block	40
Process Structures	40
Pipes	45

For each of the three alternatives potential marginal costs associated with R&R were determined using Table 4-5 and are presented in this section of the report.

### 4.3.1 Keep AWWRF Operational Alternative

For the Keep AWWRF Operational Alternative, recent capital improvement program (CIP) projects were reviewed for items that are projected to be replaced or rehabilitated at the existing AWWRF during the study period (Appendix A).

Available CIP projections were available through the year 2025, however, the selected study period extends through the year 2030. To extend potential CIP projections through the year 2030, the known CIP projects, which are presented in **Table 4-6**, were projected into the future using the anticipated useful life projections presented in Table 4-5.

**Table 4-6. Projected Capital Improvement Projects for AWWRF**

AWWRF Capital/Rehab Items	2010 \$	Useful Life (Years)	Cycle 1 R&R Year	Cycle 2 R&R Year	Cycle 3 R&R Year
Admin Building Rehab (Engineering)	300,000	20	2013		
Admin Building Rehab (Construction)	3,000,000	20	2014		
Aeration - Aerator Gear Box Rebuild	65,000	8	2011	2019	2027
Aeration - Aerator Gear Box Rebuild	65,000	8	2013	2021	2029
Aeration - New Aerator Gear Box	120,000	15	2011	2026	
Biosolids Dewatering Replacement (Engineering)	150,000	15	2014	2029	
Biosolids Dewatering Replacement (Construction)	3,000,000	15	2015	2030	
Chlorine Contact Chamber Expansion (Engineering)	100,000	40	2012		
Chlorine Contact Chamber Expansion (Construction)	850,000	40	2013		
Clarifier #1 & #2 Modification	2,600,000	15	2022		
Clarifier #3 & #4 Modification	2,600,000	15	2022		
Digester Cover Replacement (Engineering)	750,000	20	2012		
Digester Cover Replacement (Construction)	1,750,000	20	2013		
Digester Mixer Replacement	300,000	15	2011	2026	
Digester Mixer Replacement	300,000	15	2012	2027	
Digester Mixer Replacement	300,000	15	2013	2028	
Filter Rebuild/Rehab	120,000	10	2011	2021	
Filter Rebuild/Rehab	120,000	10	2012	2022	
Filter Rebuild/Rehab	120,000	10	2013	2023	
Final Distribution Pump Replacement	80,000	15	2011	2026	
Final Distribution Pump Replacement	80,000	15	2012	2027	
Final Distribution Pump Replacement	80,000	15	2013	2028	
Final Distribution Pump Replacement	80,000	15	2014	2029	
GBT Replacement	1,000,000	15	2017		
Generator Addition (Engineering)	150,000	15	2011	2026	
Generator Addition (Construction)	1,500,000	15	2012	2027	
Headworks - Rebuild Fine Barscreens	200,000	15	2013	2028	
Headworks - Rebuild Fine Barscreens	200,000	15	2014	2029	
Headworks Rehab – Structure	300,000	20	2012		
Influent Pumping Station with Lift Station Modifications	8,592,000	20	2011		
Influent Pump & VFD Replacement	130,000	15	2011	2026	
Influent Pump & VFD Replacement	130,000	15	2012	2027	
In-Plant Lift Station	250,000	20	2011		
Low head Pump/Motor Replacement	60,000	15	2011	2026	
Low head Pump/Motor Replacement	60,000	15	2012	2027	
Low head Pump/Motor Replacement	60,000	15	2013	2028	
Low head Pump/Motor Replacement	60,000	15	2014	2029	
Solids - New GBT	1,500,000	15	2013	2028	
Polymer Unit Replacement	150,000	15	2011	2026	
Process Equipment Replacement	310,000	15	2011	2026	
Process Equipment Replacement	580,000	15	2012	2027	

Process Equipment Replacement	570,000	15	2013	2028	
Process Equipment Replacement	300,000	15	2014	2029	
Process Equipment Replacement	460,000	15	2015	2030	
Return Sludge Replacement	60,000	15	2011	2026	
Return Sludge Replacement	60,000	15	2012	2027	
SCADA Phase 2	250,000	15	2011	2026	
Side Stream Lift Station	500,000	20	2011		
Waste Sludge Pump Replacement	100,000	15	2011	2026	
<b>Totals (\$millions)</b>			<b>\$39.0</b>	<b>\$20.2</b>	<b>\$0.2</b>

After adding an escalation of 3.00% per year and adding all R&R cycles for each of the projected CIP projects the total projected R&R for the Keep AWWRF Operational Alternative totals approximately \$59.4 million dollars.

In addition to the evaluation for CIP projects for the existing facility, projected R&R costs were also estimated for the new reject water pump station. Items included with the projected replacements costs in 2010 dollars are presented in **Table 4-7**. These costs do not include the allocations presented in Table 4-1 with the exception of the 7.00% sales tax which was added. Projected R&R costs were escalated at 3.00% per year to the year 2026 which corresponds to when the items are projected to need replacement.

**Table 4-7. Estimated R&R Costs for Reject Water Pump Station**

Item Description	Useful Life (Years)	Estimated Cost in 2010 \$	Estimated Cost in 2026 \$
Pumps	15	\$ 124,932	\$ 200,479
Instrumentation	15	\$ 15,580	\$ 25,002
Electrical	15	\$ 26,750	\$ 42,926
<b>Total</b>		<b>\$ 167,262</b>	<b>\$ 268,407</b>

### 4.3.2 SWWRF Only Flow Diversion Alternative

For the SWWRF Only Flow Diversion Alternative, items that were projected to require R&R during the 20 year study period were included in the R&R cost evaluation and are presented in **Table 4-8**. These costs do not include the allocations presented in Table 4-1 with the exception of the 7.00% sales tax which was added. Projected R&R costs were escalated at 3.00% per year to the year 2026 which corresponds to when the items are projected to need replacement.

**Table 4-8. Flow Diversion to SWWRF Only - Estimated R&R Costs**

Item Description	Useful Life (Years)	Estimated Cost in 2010 \$	Estimated Cost in 2026 \$
Pumps	15	\$ 319,706	\$ 513,035
Grinder	15	\$ 144,285	\$ 231,535
Odor Control	15	\$ 362,048	\$ 580,981
Electrical	15	\$ 732,685	\$ 1,175,744
Instrumentation	15	\$ 217,811	\$ 349,523
<b>Total</b>		<b>\$ 1,776,536</b>	<b>\$ 2,850,819</b>

### 4.3.3 SWWRF and NWWRF Flow Diversion Alternative

For the SWWRF and NWWRF Flow Diversion Alternative, items that were projected to require R&R during the 20 year study period were included in the R&R cost evaluation and are presented in **Table 4-9**. These costs do not include the allocations presented in Table 4-1 with the exception of the 7.00% sales tax which was added. Projected R&R costs were escalated at 3.00% per year to the year 2026 which corresponds to when the items are projected to need replacement.

**Table 4-9. Flow Diversion to SWWRF and NWWRF - Estimated R&R Costs**

Item Description	Useful Life (Years)	Estimated Cost in 2010 \$	Estimated Cost in 2026 \$
Pumps	15	\$ 709,187	\$ 1,138,038
Grinder	15	\$ 144,285	\$ 231,535
Odor Control	15	\$ 362,048	\$ 580,981
Electrical	15	\$ 1,222,928	\$ 1,962,440
Instrumentation	15	\$ 197,558	\$ 317,023
<b>Subtotal</b>		<b>\$ 2,636,000</b>	<b>\$ 4,230,018</b>
Pasadena Pump	15	\$ 90,837	\$ 145,766
<b>Total</b>		<b>\$ 2,726,844</b>	<b>\$ 4,375,784</b>

## 4.4 Operations and Maintenance Costs

The evaluation for operations and maintenance (O&M) marginal costs includes operating costs such as power (electricity), chemicals, sludge handling, land lease, staffing, and general maintenance costs.

O&M costs presented are based on records for Fiscal Year (FY) 2009 actual expenditures that were provided by the City (Appendix A). The 2009 dollar values were escalated by 3.00% per year to provide the projected annual expenditures throughout the 20 year study period.

Projected electricity costs for the new pump stations were estimated using historical data for the past 12 months for the Northeast Master Pump Station (#63) and the Big Lake Maggiore Pump Station (#28). An average cost per MGD was computed for each pump station (Appendix A). This approach incorporates both peak and non-peak billing rates for flows through the pump stations. These pump stations were selected

due to their similarities for hp and head requirements to the new flow diversion alternative pump stations.

Additional potential O&M costs for the pump stations were calculated using information provided by the City for historical costs incurred at similar pump stations. Cost estimates include:

- Odor Control Annual Service Contracts
- Chemical Costs for Odor Control
- Maintenance Costs for Blowers and Pumps
- Lawn Care
- Air Conditioning Maintenance
- Generator Service Contract
- Overhead Crane Maintenance
- Staffing Costs for Maintenance Personnel

#### **4.4.1 Keep AWWRF Operational Alternative**

Annual expenditures for O&M at the existing AWWRF for FY2009 totaled \$3.1M. The expenditures for each year were escalated at 3.00% and totaled over the 20 year period for a grand total of \$88.4M at the end of the study period.

Projected O&M costs were also estimated for the new reject water pump station. Assumptions included that two 7MG reject events may occur each month and that man-hour requirements for maintenance for these above grade pumps would be half of that required for the flow diversion pump stations. An average of the daily electrical costs per MGD for the Northeast Master Pump Station (#63) and the Big Lake Maggiore Pump Station (#28) was utilized to calculate potential electrical costs at the reject pump station.

Also associated with the current O&M program for existing pump stations is a pump rebuild that is performed as part of the pump maintenance program. It was assumed that this rebuild would occur eight years after the pump was placed into service. The estimated cost in 2010 dollars for pump rebuilds was \$20,000, at \$10,000 per pump, and was projected to occur in the year 2019.

The estimated O&M costs for the reject pump station were also escalated from 2010 dollars at 3.00% per year and totaled over the study period to provide a total O&M cost estimate. The overall O&M marginal cost estimates for the Keep AWWRF Operational Alternative are presented in **Table 4-10**.

**Table 4-10. Estimated Marginal O&M Costs for Keep AWWRF Operational Alternative**

Item Description	Estimated Annual Cost in 2010 \$	Total O&M Costs Over 20 Year Study Period <sup>1</sup>
Existing AWWRF	\$ 3,194,773	\$ 88,420,083
Reject Pump Station		
Electricity	\$ 8,491	\$ 234,999
Other O&M	\$ 26,000	\$ 719,589
Pump Rebuild (2 Pumps) <sup>2</sup>	\$ 20,000	\$ 26,095
<b>Total</b>		<b>\$ 89,400,766</b>

Notes:

1. Sum total per year over 20 year study period with 3.00% escalation applied to each year.
2. Occurs in the year 2019, 8 years after installation.

#### 4.4.2 SWWRF Only Flow Diversion Alternative

Annual expenditures for O&M at the SWWRF for FY2009 were provided by the City. The major cost categories which would increase at SWWRF as a result of the additional 7 MGD of flow that would be diverted to SWWRF include electricity, chemical costs of treatment, and sludge disposal costs. A historical average annual cost per MGD was determined for the SWWRF and this cost was applied to the additional 7 MGD of flow to calculate the additional costs for these items that may be realized at the SWWRF over the 20 year study period. Potential additional costs for staffing were also included.

As previously discussed, the City will retain the existing injection, monitoring, and REWARD wells which are currently located at the AWWRF. Because access to these wells will need to be retained, a portion of the current land lease cost will also need to be retained. As a conservative estimate, 50 percent of the existing land lease costs have been included in the O&M cost estimate for this flow diversion alternative.

Projected O&M costs were also estimated for the new flow diversion pump station. An average of the daily electrical costs per MGD for the Northeast Master Pump Station (#63) and the Big Lake Maggiore Pump Station (#28) was utilized to calculate potential electrical costs at the new flow diversion pump station. Additional potential O&M costs were estimated utilizing data provided by the City (Appendix A).

Also associated with the current O&M program for existing pump stations is a pump rebuild that is performed as part of the pump maintenance program. It was assumed that this rebuild would occur eight years after the pump was placed into service. The estimated cost in 2010 dollars for pump rebuilds was \$30,000, at \$10,000 per pump, and was projected to occur in the year 2019.

The estimated marginal O&M costs were also escalated from 2010 dollars at 3.00% per year and totaled over the study period to provide a total O&M cost estimate. The overall O&M cost estimates for the SWWRF Only flow diversion alternative are presented in **Table 4-11**.

**Table 4-11. Estimated Marginal O&M Costs for SWWRF Only Flow Diversion Alternative**

Item Description	Estimated Annual Cost in 2010 \$	Total O&M Costs Over 20 Year Study Period <sup>1</sup>
Additional Costs at SWWRF		
Electricity	\$ 537,210	\$ 14,868,083
Chemicals	\$ 258,739	\$ 7,160,997
Sludge Disposal	\$ 201,966	\$ 5,589,702
Staffing	\$ 369,264	\$ 10,219,919
Retained Costs at AWWRF		
Land Lease Costs	\$ 92,112	\$ 2,549,336
Flow Diversion Pump Station		
Electricity	\$ 127,364	\$ 3,524,992
Other O&M	\$ 74,020	\$ 2,048,613
Pump Rebuild (3 Pumps) <sup>2</sup>	\$ 30,000	\$ 39,143
	<b>Total</b>	<b>\$ 46,000,785</b>

Notes:

1. Sum total per year over 20 year study period with 3.00% escalation applied to each year.
2. Occurs in the year 2019, 8 years after installation.

#### 4.4.3 SWWRF and NWWRF Flow Diversion Alternative

Annual expenditures for O&M at the SWWRF and NWWRF for FY2009 were provided by the City. The major cost categories which would increase at both the SWWRF and NWWRF as a result of the additional flow that would be diverted include electricity, chemical costs of treatment, and sludge disposal costs. A historical average annual cost per MGD was determined for the SWWRF and NWWRF. The annual average costs for the SWWRF were applied to the additional 3.31 MGD of flow to calculate the additional costs for these items that may be realized at the SWWRF over the 20 year study period. Likewise, the annual average costs for the NWWRF were applied to the additional 3.69 MGD of flow to calculate the additional costs for these items that may be realized at the NWWRF over the 20 year study period. Potential additional costs for staffing were also included.

As previously discussed, the City will retain the existing injection, monitoring, and REWARD wells which are currently located at the AWWRF. Because access to these wells will need to be retained, a portion of the current land lease cost will also need to be retained. As a conservative estimate, 50 percent of the existing land lease costs have been included in the O&M cost estimate for this flow diversion alternative.

Projected O&M costs were also estimated for the new flow diversion pump station. The average daily electrical costs per MG per day for the Big Lake Maggiore Pump Station (#28) were utilized to calculate potential electrical costs at the new flow diversion pump station. Additional potential O&M costs were estimated utilizing data provided by the City (Appendix A).

Projected O&M costs were also estimated for the new pump at the Pasadena pump station. The average daily electrical costs per MG per day were calculated for the

existing Pasadena Pump Station using historical data. These costs were utilized to calculate potential electrical costs for the additional 3.69 MGD of flow. Any additional O&M costs at the Pasadena pump station due to the addition of one pump would be minimal and were therefore not included.

Also associated with the current O&M program for existing pump stations is a pump rebuild that is performed as part of the pump maintenance program. It was assumed that this rebuild would occur eight years after the pump was placed into service. The estimated cost in 2010 dollars for pump rebuilds was \$40,000, at \$10,000 per pump with three pumps at new flow diversion pump station and one new pump at the Pasadena pump station, and was projected to occur in the year 2019.

The estimated marginal O&M costs were also escalated from 2010 dollars at 3.00% per year and totaled over the study period to provide a total O&M cost estimate. The overall O&M cost estimates for the SWWRF and NWWRF flow diversion alternative are presented in **Table 4-12**.

**Table 4-12. Estimated Marginal O&M Costs for SWWRF and NWWRF Flow Diversion Alternative**

Item Description	Estimated Annual Cost in 2010 \$	Total O&M Costs Over 20 Year Study Period <sup>1</sup>
Additional Costs at SWWRF		
Electricity	\$ 254,024	\$ 7,030,479
Chemicals	\$ 122,347	\$ 3,386,128
Sludge Disposal	\$ 95,501	\$ 2,643,131
Additional Costs at NWWRF		
Electricity	\$ 266,227	\$ 7,368,230
Chemicals	\$ 139,052	\$ 3,848,462
Sludge Disposal	\$ 115,139	\$ 3,186,650
Staffing		
Staffing	\$ 369,264	\$ 10,219,919
Retained Costs at AWWRF		
Land Lease Costs	\$ 92,112	\$ 2,549,336
Flow Diversion Pump Station		
Electricity	\$ 131,543	\$ 3,640,652
Other O&M	\$ 74,020	\$ 2,048,613
Pump Rebuild (3 Pumps) <sup>2</sup>	\$ 30,000	\$ 39,143
Pasadena Pump Station		
Electricity	\$ 25,041	\$ 693,053
Pump Rebuild (1 Pump) <sup>2</sup>	\$ 10,000	\$ 13,048
	<b>Total</b>	<b>\$ 46,666,844</b>

Notes:

1. Sum total per year over 20 year study period with 3.00% escalation applied to each year.
2. Occurs in the year 2019, 8 years after installation.

## 4.5 Summary of Costs

A summary of the marginal capital and O&M costs presented for each of the three alternatives in this section are provided in **Table 4-13**. Costs that were presented in this section are further developed in Section 5 during the development of the present worth analysis.

**Table 4-13. Summary of Marginal Costs**

<b>Keep AWWRF Operational Alternative</b>	
New Capital Costs (2010\$)	\$14,480,000
R & R at existing AWWRF (2011\$ – 2030\$)	\$59,400,000
R & R for Reject Water Pump Station (2026\$)	\$ 268,407
O & M Costs (2011\$ – 2030\$)	\$89,400,766
<b>SWWRF Only Flow Diversion Alternative</b>	
New Capital Costs (2010\$)	\$32,625,000
R & R Costs (2026\$)	\$2,850,819
O & M Costs (2011\$ – 2030\$)	\$46,000,785
<b>SWWRF and NWWRF Flow Diversion Alternative</b>	
New Capital Costs (2010\$)	\$40,425,000
R & R Costs (2026\$)	\$4,375,784
O & M Costs (2011\$ – 2030\$)	\$46,666,844

# Section 5

## Capital/O&M Cost Summary and Present Worth Analysis

### 5.1 Introduction

The prior sections developed the marginal capital and operation and maintenance costs in 2010 dollars. Because the beginning of the study period is 2011, these costs have been escalated and are now expressed in 2011 dollars in order to provide a comparison with the same basic assumptions. Caution should be used when referencing these marginal cost estimates for budgetary or planning purposes as the actual project costs may exceed the marginal costs presented herein.

The comparison of the alternatives is being made on a present worth basis. By using present worth, future costs are calculated as though they occurred in the base year (2011). There are two common methods of calculating present worth; with inflation and without inflation. For purposes of this report, inflation has been used to approximate the costs of the O&M and capital for the year in which the cost was incurred. When inflation is used to calculate the value of future costs, the discount rate is adjusted to reflect the use of inflation. This adjusted discount rate is termed the “nominal discount rate”. The discount rate is generally thought of as the time value of money, or an opportunity rate. The following rates were used throughout this section of the report:

- Inflation Rate of 3.00%
- Discount Rate of 5.00%
- Nominal Discount Rate of 8.15%

Alternative analyses were performed varying the rates stated above in addition to an analysis with no inflation rate and the results of these analyses are presented in **Appendix C**.

The operation & maintenance and capital costs that are being considered in this section are the marginal costs. In other words, if the costs of either operation & maintenance or capital would continue regardless of whether the flow from AWWRF was diverted, those costs are not considered. Thus, only the costs that are incremental or that change with the diversion were used.

Cash flow diagrams for each of the three alternatives for capital and O&M costs with present worth developed in this section are presented in **Appendix D**.

## 5.2 Capital Cost Summary

The capital costs for the three alternatives which were presented in Section 4 on Tables 4-2, 4-3, and 4-4 in 2010 dollars. These costs were escalated using a 3.00% inflation rate and are summarized on **Table 5-1**.

In addition to the construction costs for the two diversion alternatives, there are also demolition costs for the existing structures at AWWRF. The pipeline costs were estimated by CDM Constructors Inc. (CCI).

**Table 5-1. Summary of New Capital Costs**

<b>Summary of Capital Costs</b>			
	<b>AWWRF OPERATIONAL - Capital Costs (2011 \$)</b>	<b>AWWRF DIVERSION TO SWWRF (2011 \$)</b>	<b>AWWRF DIVERSION TO SWWRF AND NWWRF (2011 \$)</b>
Land Costs (2010 \$ - no inflation)	\$4,900,000		
Capital Costs			
Reject Water Pump Station - Pumps, Electrical, Meters	592,250		
Reject Water Pump Station - Tank	4,418,185		
Reject Water Pump Station - Piping	4,832,760		
Pipe Installation for Conveyance		\$21,803,040	\$27,801,760
Pump Station at AWWRF - Gravity Pipe Modifications		710,700	710,700
Reward Well Piping Connection		118,450	118,450
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation		3,908,850	5,567,150
Pump Station at AWWRF - Structure		2,132,100	2,250,550
Reclaimed Water 2 MG Storage Tank		1,776,750	1,776,750
Extra Pump at Pasadena Pump Station			230,720
Demolition Costs		3,553,500	3,553,500
<b>Total Capital Costs</b>	<b>\$14,743,195</b>	<b>\$34,003,390</b>	<b>\$42,009,580</b>

## 5.3 Capital Cost Salvage Value

The capital infrastructure included in the capital cost computations has value beyond the end of the twenty year planning period. This value is called salvage value. All three alternatives include salvage value for those improvements with a useful life that extends beyond 2030.

**Table 5-2** provides the salvage value for all three alternatives including the conveyance system to either the SWWRF or a combination of the SWWRF and NWWRF. Only items with a useful life in excess of the twenty year study period will have a salvage value. The accumulated depreciation equals the expired years divided by the useful life then multiplying that ratio times the cost in 2011 dollars. The salvage value equals the cost in 2011 dollars less the accumulated depreciation.

**Table 5-2. New Capital Costs - Salvage Value**

	Useful Life	Cost in 2011 Dollars <sup>a</sup>	Expired Study Period Years (Dec. 2030 - Jan. 2011)	Accumulated Depreciation <sup>b</sup>	Salvage Value <sup>c</sup>
<b>AWWRF Operational</b>					
Land Costs	N/A	\$4,900,000		\$0	\$4,900,000
Reject Water Pump Station - Mechanical, Electrical, Instrumentation	15	592,250	20	592,250	-
Reject Water Pump Station - Tank	40	4,418,185	20	2,209,093	2,209,093
Reject Water Pump Station - Piping	45	4,832,760	20	2,147,893	2,684,867
<b>Total</b>		<b>\$14,743,195</b>		<b>\$4,949,236</b>	<b>\$9,793,959</b>
<b>AWWRF DIVERSION TO SWWRF</b>					
Pipe Installation for Conveyance	45	\$21,803,040	20	\$9,690,240	\$12,112,800
Pump Station at AWWRF - Gravity Pipe Modifications	45	710,700	20	315,867	394,833
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation	15	3,908,850	20	3,908,850	-
Reward Well Future Connection to Pump Station	45	118,450	20	52,644	65,806
Reclaimed Water 2 MG Storage Tank	40	1,776,750	20	888,375	888,375
Pump Station at AWWRF - Structure	20	2,132,100	20	2,132,100	-
<b>Total</b>		<b>\$30,449,890</b>		<b>\$16,988,076</b>	<b>\$13,461,814</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>					
Pipe Installation for Conveyance	45	\$27,801,760	20	\$12,356,338	\$15,445,422
Pump Station at AWWRF - Gravity Pipe Modifications	45	710,700	20	315,867	394,833
Reward Well Future Connection to Pump Station	45	118,450	20	52,644	65,806
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation	15	5,567,150	20	5,567,150	-
Pump Station at AWWRF - Structure	20	2,250,550	20	2,250,550	-
Reclaimed Water 2 MG Storage Tank	40	1,776,750	20	888,375	888,375
Extra Pump at Pasadena Pump Station	15	230,720	20	230,720	-
<b>Total</b>		<b>\$38,456,080</b>		<b>\$21,661,644</b>	<b>\$16,794,436</b>

<sup>a</sup> Costs taken from Table 5-1 in 2011 \$.

<sup>b</sup> Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>c</sup> Salvage value equals cost less depreciation.

In addition to the initial capital costs, there are also costs of periodically replacing new items such as pumps. **Table 5-3** presents these replacement costs of new equipment only for all three alternatives. Because items with a 15 year useful life that were initially installed in 2011 will need to be replaced in the year 2026, these costs have been escalated to the year 2026. The salvage value for the items replaced in 2026 for all three alternatives was also calculated. The accumulated depreciation equals the

expired years divided by the useful life then multiplying that ratio times the cost in 2026 dollars. The salvage value equals the cost in 2026 dollars less the accumulated depreciation.

**Table 5-3. New Capital Cost Renewal & Replacement - Salvage Value**

	Useful Life	Cost in Year 2026 <sup>a</sup>	Expired Study Period Years (Dec. 2030 - Jan. 2026)	Accumulated Depreciation <sup>b</sup>	Salvage Value <sup>c</sup>
<b>AWWRF Operational</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Reject Pump Station	15	\$268,407	5	\$89,469	\$178,938
<b>Total</b>		<b>\$268,407</b>		<b>\$89,469</b>	<b>\$178,938</b>
<b>AWWRF DIVERSION TO SWWRF</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Flow Diversion Pump Station	15	\$2,850,819	5	\$950,273	\$1,900,546
<b>Total</b>		<b>\$2,850,819</b>		<b>\$950,273</b>	<b>\$1,900,546</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Flow Diversion Pump Station	15	\$4,230,018	5	\$1,410,006	\$2,820,012
Additional pump at Pasadena PS	15	145,766	5	48,589	97,177
<b>Total</b>		<b>\$4,375,784</b>		<b>\$1,458,595</b>	<b>\$2,917,189</b>

<sup>a</sup> The costs in 2010 \$ for equipment only were as follows:

AWWRF - Reject Water Pump Station - Mechanical, Electrical, Instrumentation	\$167,262
AWWRF - Diversion to SWWRF Pump Station - Mechanical, Electrical, Instrumentation	\$1,776,536
AWWRF - Diversion to SWWRF & NWWRF Pump Station - Mechanical, Electrical, Instrumentation	\$2,636,007
AWWRF Diversion to SWWRF & NWWRF - Pasadena Pump	\$90,837

<sup>b</sup> Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>c</sup> Salvage value equals cost less depreciation.

## 5.4 Replacement and Rehabilitation Summary

The alternative of keeping AWWRF and maintaining its operability requires a number of projects of a renewal and replacement type. The useful life of the various items was established and previously presented in Table 4-1, with some items requiring multiple replacements during the twenty year planning period. The replacement costs for these components are presented on Table 5-4, with the costs inflated at 3% per year from 2011 to the year of replacement.

**Table 5-4. AWWRF Operational - Renewal & Replacement (CIP) Cost Summary**

Item #	AWWRF Capital/Rehab Items	No. Cycles	2010 \$ <sup>a</sup>	Cycle 1 R&R Year <sup>b</sup>	Cycle 1 R&R Cost <sup>c</sup>	Cycle 2 R&R Year <sup>b</sup>	Cycle 2 R&R Cost <sup>c</sup>	Cycle 3 R&R Year <sup>b</sup>	Cycle 3 R&R Cost <sup>c</sup>
1	Admin Building Rehab	1	\$300,000	2013	\$327,818				
1	Admin Building Rehab	1	\$3,000,000	2014	\$3,376,526				
2	Aeration - Aerator Gear Box Rebuild (6 - 3 @ a time)	3	65,000	2011	66,950	2019	\$84,810	2027	\$107,435
3	Aeration - Aerator Gear Box Rebuild (6 - 3 @ a time)	3	65,000	2013	71,027	2021	\$89,975	2029	113,978
4	Aeration - New Aerator Gear Box (2 @ a time)	2	120,000	2011	123,600	2026	\$192,565		
5	Biosolids Dewatering Replacement	2	150,000	2014	168,826	2029	\$263,026		
5	Biosolids Dewatering Replacement	2	3,000,000	2015	3,477,822	2030	\$5,418,334		
6	CCC Expansion	1	100,000	2012	106,090				
6	CCC Expansion	1	850,000	2013	928,818				
7	Clarifier #1 & #2 Modification	1	2,600,000	2022	3,706,978				
8	Clarifier #3 & #4 Modification	1	2,600,000	2022	3,706,978				
9	Digester Cover Replacement	1	750,000	2012	795,675				
9	Digester Cover Replacement	1	1,750,000	2013	1,912,272				
10	Digester Mixer Replacement (3)	2	300,000	2011	309,000	2026	481,412		
11	Digester Mixer Replacement (3)	2	300,000	2012	318,270	2027	495,854		
12	Digester Mixer Replacement (3)	2	300,000	2013	327,818	2028	510,730		
13	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2011	123,600	2021	166,108		
14	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2012	127,308	2022	171,091		
15	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2013	131,127	2023	176,224		
16	Final Distribution Pump Replacement (4)	2	80,000	2011	82,400	2026	128,377		
17	Final Distribution Pump Replacement (4)	2	80,000	2012	84,872	2027	132,228		
18	Final Distribution Pump Replacement (4)	2	80,000	2013	87,418	2028	136,195		
19	Final Distribution Pump Replacement (4)	2	80,000	2014	90,041	2029	140,280		
20	GBT Replacement	1	1,000,000	2017	1,229,874				
20	Generator Addition	2	150,000	2011	154,500	2026	240,706		
21	Generator Addition	2	1,500,000	2012	1,591,350	2027	2,479,271		
22	Headworks - Rebuild Fine Barscreens #1 & #2	2	200,000	2013	218,545	2028	340,487		

**Table 5-4. AWWRF Operational - Renewal & Replacement (CIP) Cost Summary (continued)**

Item #	AWWRF Capital/Rehab Items	No. Cycles	2010 \$ <sup>a</sup>	Cycle 1 R&R Year <sup>b</sup>	Cycle 1 R&R Cost <sup>c</sup>	Cycle 2 R&R Year <sup>b</sup>	Cycle 2 R&R Cost <sup>c</sup>	Cycle 3 R&R Year <sup>b</sup>	Cycle 3 R&R Cost <sup>c</sup>
23	Headworks - Rebuild Fine Barscreens #1 & #2	2	200,000	2014	225,102	2029	350,701		
24	Headworks Rehab - Structure	1	300,000	2012	318,270				
25	Influent Pumping Station with Lift Station Mods	1	8,592,000	2011	8,849,760				
26	Influent Pump & VFD Replacement (4 - 2 @ a time)	2	130,000	2011	133,900	2026	208,612		
27	Influent Pump & VFD Replacement (4 - 2 @ a time)	2	130,000	2012	137,917	2027	214,870		
28	In-Plant Lift Station	1	250,000	2011	257,500				
29	Low head Pump/Motor Replacement (4)	2	60,000	2011	61,800	2026	96,282		
30	Low head Pump/Motor Replacement (4)	2	60,000	2012	63,654	2027	99,171		
31	Low head Pump/Motor Replacement (4)	2	60,000	2013	65,564	2028	102,146		
32	Low head Pump/Motor Replacement (4)	2	60,000	2014	67,531	2029	105,210		
33	Solids - New GBT	2	1,500,000	2013	1,639,091	2028	2,553,650		
34	Polymer Unit Replacement	2	150,000	2011	154,500	2026	240,706		
35	Process Equipment Replacement	2	310,000	2011	319,300	2026	497,459		
36	Process Equipment Replacement	2	580,000	2012	615,322	2027	958,652		
37	Process Equipment Replacement	2	570,000	2013	622,854	2028	970,387		
38	Process Equipment Replacement	2	300,000	2014	337,653	2029	526,052		
39	Process Equipment Replacement	2	460,000	2015	533,266	2030	830,811		
40	Return Sludge Replacement (2)	2	60,000	2011	61,800	2026	96,282		
41	Return Sludge Replacement (2)	2	60,000	2012	63,654	2027	99,171		
42	SCADA Phase 2	2	250,000	2011	257,500	2026	401,177		
43	Side Stream Lift Station	1	500,000	2011	515,000				
44	Waste Sludge Pump Replacement	2	100,000	2011	103,000	2026	160,471		
	<b>Totals</b>		<b>\$34,462,000</b>		<b>\$39,049,442</b>		<b>\$20,159,482</b>		<b>\$221,413</b>

<sup>a</sup> The costs for the initial replacement is presented in 2010 \$.

<sup>b</sup> This is the actual year of replacement for each cycle.

<sup>c</sup> The costs for each item are inflated to the year of replacement for each cycle.

## 5.5 Replacement and Rehabilitation Salvage Value

The R&R costs that were estimated above have value beyond the end of the twenty year planning period. **Table 5-5** provides the salvage value for the alternative of keeping AWWRF operational. The years of the cost are separately identified and the expired years vary accordingly. The accumulated depreciation equals the expired years divided by the useful life then multiplying that ratio times the cost in the year of replacement. The salvage value equals the cost in the replacement year less the accumulated depreciation.

**Table 5-5. AWWRF - Renewal & Replacement Cost Salvage Value**

Item Numbers <sup>a</sup>	Useful Life <sup>b</sup>	Last Installation Year <sup>c</sup>	Cost in Year XXXX <sup>d</sup>	Expired Study Period Years (Dec. 2030 - Jan. XXXX) <sup>e</sup>	Accumulated Depreciation <sup>f</sup>	Salvage Value <sup>g</sup>
Items #2	8	2027	107,435	4	53,718	53,718
Items #3	8	2029	113,978	2	28,494	85,483
Items #13	10	2021	166,108	10	166,108	-
Items #14	10	2022	171,091	9	153,982	17,109
Items #15	10	2023	176,224	8	140,979	35,245
Items #20	15	2017	1,229,874	14	1,147,882	81,992
Items #7, 8	15	2022	7,413,957	9	4,448,374	2,965,583
Items #4, 10, 16, 20, 26, 29, 34, 35, 40, 42, 44	15	2026	2,744,048	5	914,683	1,829,365
Items #11, 17, 21, 27, 30, 36, 41	15	2027	4,479,217	4	1,194,458	3,284,759
Items #12, 18, 22, 31, 33, 37	15	2028	4,613,594	3	922,719	3,690,875
Items #19, 23, 32, 38	15	2029	1,122,244	2	149,633	972,611
Items #5, 39	15	2030	6,512,171	1	434,145	6,078,026
Items #25, 28, 43	20	2011	9,622,260	20	9,622,260	-
Items #24	20	2012	318,270	19	302,357	15,914
Items #9	20	2013	2,707,947	18	2,437,153	270,795
Items #1	20	2014	3,704,345	17	3,148,693	555,652
Items #6	40	2013	1,034,908	18	465,709	569,199
<b>Totals</b>			<b>\$46,237,670</b>		<b>\$25,731,345</b>	<b>\$20,506,325</b>

<sup>a</sup> The item numbers identify the costs from Table 5-4.

<sup>b</sup> The useful life was provided by City staff.

<sup>c</sup> The last installation year equals the year in which there is a remaining useful life.

<sup>d</sup> The cost in this column equals the cost in the year of replacement for the last installation year for that item.

<sup>e</sup> The expired study period years equals Dec. 2030 less the last installation year.

<sup>f</sup> Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>g</sup> Salvage value equals cost less depreciation.

## 5.6 Operation and Maintenance Cost Analysis

Operation and maintenance costs identified were previously identified in Section 4 of this report. These costs are presented in 2011 dollars on **Table 5-6**. The amounts for the AWWRF operational alternative reflect actual costs from fiscal year 2009, increased by 3.00 percent inflation. In addition, there are electricity and maintenance costs for the Reject Water Storage and Pumping project. These costs were based on those of a similar pump station. There is also a cost included for rehabilitating these pumps in the interval between the replacement years for these pumps.

The operation and maintenance costs for the diversion alternatives include only those that are incremental and are presented on **Table 5-6**. These incremental costs include the costs for electricity, chemicals and sludge removal for the flow being transferred as well as personnel services. There is also an estimate for the portion of the land lease (50 percent of existing) that would be used by the new pump station. There are electricity and maintenance costs for the pump station that transfers the flow from AWWRF to either the SWWRF or a combination of the SWWRF and NWWRF. These costs were based on those of a similar pump station. There is also a cost included for rehabilitating these pumps in the interval between the replacement years for these pumps. For the diversion to a combination of the SWWRF and NWWRF, there are also additional pumping needs, with additional electricity costs plus the cost of replacing the pumps in the interval between pump replacements presented.

Because the beginning of the study period is 2011, the operation and maintenance costs are presented in 2011 dollars.

**Table 5-6. Operation & Maintenance Costs**

	Annual Escalation Rate	2010 \$	2011 \$
<b>AWWRF Operational</b>			
Existing O&M Costs <sup>a</sup>	3.00%	\$3,194,773	\$3,290,616
Electricity - Reject Water Pumping <sup>b</sup>	3.00%	8,491	8,746
Maintenance - Reject Water Pumping <sup>c</sup>	3.00%	26,000	26,780
<b>Total Annual O&amp;M - AWWRF</b>		<b>\$3,229,264</b>	<b>\$3,326,142</b>
One Time Cost -Rehab - Reject Water Pumps (2)(costs in 2010 & 2019 \$) <sup>d</sup>	3.00%	<b>\$20,000</b>	<b>\$26,095</b>
<b>AWWRF DIVERSION TO SWWRF</b>			
Electricity - AWWRF Pump Station <sup>b</sup>	3.00%	\$127,364	\$131,185
Odor Control & Maintenance - AWWRF Pump Station <sup>e</sup>	3.00%	74,020	76,241
Increased O&M Costs - SWWRF <sup>f</sup>	3.00%	1,367,179	1,408,194
Land Lease Costs <sup>g</sup>	3.00%	92,112	94,875
<b>Total Annual O&amp;M - Diversion to SWWRF</b>		<b>\$1,660,675</b>	<b>\$1,710,495</b>
One Time Cost -Rehab Diversion Pumps (3)(costs in 2010 & 2019 \$) <sup>d</sup>	3.00%	<b>\$30,000</b>	<b>\$39,143</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>			
Electricity - AWWRF Pump Station <sup>b</sup>	3.00%	\$131,543	\$135,489
Odor Control & Maintenance - AWWRF Pump Station <sup>e</sup>	3.00%	74,020	76,241
Electricity - Pasadena Pump Station <sup>b</sup>	3.00%	25,041	25,792
Increased O&M Costs - SWWRF and NWWRF <sup>f</sup>	3.00%	1,361,553	1,402,399
Land Lease Costs <sup>g</sup>	3.00%	92,112	94,875
<b>Total Annual O&amp;M - Diversion to SWWRF &amp; NWWRF</b>		<b>\$1,684,269</b>	<b>\$1,734,797</b>
One Time Cost -Rehab Diversion Pumps (3)(costs in 2010 & 2019 \$) <sup>d</sup>	3.00%	<b>\$30,000</b>	<b>\$39,143</b>
One Time Cost -Rehab Pasadena Pump (1)(costs in 2010 & 2019 \$) <sup>d</sup>	3.00%	<b>\$10,000</b>	<b>\$13,048</b>

<sup>a</sup> The existing O&M costs for AWWRF equal the FY2009 costs increased by 3% inflation annually.

<sup>b</sup> FY2009 costs at various pump stations were used to estimate the electrical costs for the new pumping requirements.

<sup>c</sup> Based on 1/2 of a 2 person crew at 10 hours each/week. A loaded rate of \$50/hour was used.

<sup>d</sup> Pump rehab costs were estimated at \$10,000 each, inflated at 3% annually to 2019.

<sup>e</sup> Odor control and maintenance based on existing pump station costs, with a 2 person crew working 10 hours/wk each at a \$50/hour loaded rate.

<sup>f</sup> Electrical, chemical, sludge costs were based on actual FY2009 costs adjusted for the quantity of flow diverted.

Personnel costs were estimated, based on new staffing requirements.

<sup>g</sup> Land lease costs are estimated to equal 1/2 of the existing cost.

## 5.7 Present Worth Analysis

As a basis for comparing the various options, a present worth analysis was conducted. The first step in the analysis was to calculate the present worth of the capital costs. This calculation is presented for the AWWRF operational alternative on

**Table 5-7.** The capital costs were already inflated to 2011 dollars, which represents the present worth. The salvage value reflects the value of the 2030 end of period amounts in terms of 2011 dollars.

**Table 5-7. AWWRF Operational - Present Worth  
New Capital Costs and Salvage Value**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF Operational</b>			
Land Costs	\$4,900,000	1.0000	\$4,900,000
Capital Costs	9,843,195	1.0000	9,843,195
<b>Subtotal Capital Costs</b>	<b>\$14,743,195</b>		<b>\$14,743,195</b>
Salvage Value of Capital Cost Table	(9,793,959)	0.3769	(3,691,240)
<b>AWWRF Operational - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$4,949,236</b>		<b>\$11,051,955</b>

<sup>a</sup> Taken from Table 5-2.

<sup>b</sup> Present worth equals the capital costs times the present worth factor.

<sup>c</sup> Equals capital costs less the salvage value.

The present worth calculation is presented for the diversion of flow from AWWRF to the SWWRF alternative on **Table 5-8**. The capital costs were already inflated to 2011 dollars, which represents the present worth. The salvage value reflects the value of the 2030 end of period amounts in terms of 2011 dollars.

**Table 5-8. SWWRF Diversion - Present Worth New Capital Costs and Salvage Value**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF DIVERSION TO SWWRF</b>			
Land Costs	-	1.0000	-
Capital Costs	\$30,449,890	1.0000	\$30,449,890
Demolition Costs	3,553,500	1.0000	3,553,500
<b>Subtotal Option 1 Capital Costs</b>	<b>\$34,003,390</b>		<b>\$34,003,390</b>
Salvage Value of Capital Cost Table	(13,461,814)	0.3769	(5,073,616)
<b>AWWRF Diversion to SWWRF - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$20,541,576</b>		<b>\$28,929,774</b>

<sup>a</sup> Taken from Table 5-2.

<sup>b</sup> Present worth equals the capital costs times the present worth factor.

<sup>c</sup> Equals capital costs less the salvage value.

The present worth calculation is presented for the diversion of flow from AWWRF to the SWWRF and NWWRF alternative on **Table 5-9**. The capital costs were already inflated to 2011 dollars, which represents the present worth. The salvage value reflects the value of the 2030 end of period amounts in terms of 2011 dollars.

**Table 5-9. SWWRF & NWWRF Diversion - Present Worth  
New Capital Costs and Salvage Value**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>			
Land Costs	-	1.0000	-
Capital Costs	\$38,456,080	1.0000	\$38,456,080
Demolition Costs	3,553,500	1.0000	3,553,500
<b>Subtotal Option 2 Capital Costs</b>	<b>\$42,009,580</b>		<b>\$42,009,580</b>
Salvage Value of Capital Cost Table	(16,794,436)	0.3769	(6,329,646)
<b>AWWRF Diversion to SWWRF &amp; NWWRF - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$25,215,144</b>		<b>\$35,679,934</b>

<sup>a</sup> Taken from Table 5-2.

<sup>b</sup> Present worth equals the capital costs times the present worth factor.

<sup>c</sup> Equals capital costs less the salvage value.

The second step in the analysis was to calculate the present worth of the replacement and rehabilitation costs. This calculation is presented for the AWWRF operational alternative on **Table 5-10**. The replacement costs were inflated to reflect the costs in the year of replacement dollars. The replacement costs were then multiplied by the present worth factor in order to reflect the value in 2011 dollars.

In addition to the replacement and rehabilitation costs for the existing facilities, there are new pumps required for the Reject Storage facility. These pumps are shown to be replaced in 2026 (15 year useful life), with this value in 2026 brought back on a present worth basis to 2011 dollars.

The salvage value for both the existing replacement and rehabilitation projects and the new pumps are presented on Table 5-10. The salvage values represent the value in the year of replacement and the present worth factor used reflects the value of these amounts in terms of 2011 dollars.

**Table 5-10. AWWRF Operational - Present Worth of Replacement & Rehabilitation (R&R) and Salvage Value**

	Replacement Year	Table 5-4 Replacement Costs <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF Operational - R&amp;R</b>				
Items Replaced in 2011	2011	11,574,110	0.9246	10,701,905
Items Replaced in 2012	2012	4,222,382	0.8550	3,609,977
Items Replaced in 2013	2013	6,332,353	0.7905	5,005,939
Items Replaced in 2014	2014	4,265,678	0.7310	3,118,042
Items Replaced in 2015	2015	4,011,088	0.6759	2,711,001
Items Replaced in 2017	2017	1,229,874	0.5778	710,681
Items Replaced in 2019	2019	84,810	0.4940	41,900
Items Replaced in 2021	2021	256,083	0.4224	108,166
Items Replaced in 2022	2022	7,585,048	0.3906	2,962,375
Items Replaced in 2023	2023	176,224	0.3611	63,639
Items Replaced in 2026	2026	2,744,048	0.2855	783,371
Items Replaced in 2027	2027	4,586,652	0.2640	1,210,723
Items Replaced in 2028	2028	4,613,594	0.2441	1,126,061
Items Replaced in 2029	2029	1,499,248	0.2257	338,353
Items Replaced in 2030	2030	6,249,145	0.2087	1,304,038
<b>Subtotal Replacement Cost Value</b>		<b>\$59,430,337</b>		<b>\$33,796,169</b>
	<b>Replacement Year</b>	<b>Table 5-3 Replacement Costs<sup>c</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	268,407	0.2855	76,625
<b>Subtotal Replacement Cost Value</b>		<b>\$268,407</b>		<b>\$76,625</b>
	<b>Replacement Year</b>	<b>Table 5-3 Salvage Value<sup>c</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	(\$178,938)	0.2087	(\$37,340)
<b>Subtotal Salvage Cost Value</b>		<b>(\$178,938)</b>		<b>(\$37,340)</b>
	<b>Last Replacement Year</b>	<b>Table 5-5 Salvage Value<sup>d</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
<b>Subtotal Salvage Cost Value - R&amp;R</b>	Various	<b>(20,506,325)</b>	<b>0.2087</b>	<b>(\$4,279,149)</b>
<b>AWWRF Operational - Total Replacement &amp; Salvage Cost Value<sup>e</sup></b>		<b>\$39,013,481</b>		<b>\$29,556,306</b>

<sup>a</sup> Taken from Table 5-4, with amounts equal to Cycle 1, 2 and 3 costs arranged by year of replacement.

<sup>b</sup> Present worth equals the replacement cost or salvage value times the present worth factor.

<sup>c</sup> Replacement costs and Salvage Value taken from Table 5-3.

<sup>d</sup> Salvage value equals the total from Table 6-5 multiplied by the present worth factor in 2030.

<sup>e</sup> The totals equal the replacement costs and replacement cost present worth plus the salvage value and salvage value present worth.

The present worth calculation for replacement and rehabilitation for the diversion of flow from AWWRF to either the SWWRF or the SWWRF/NWWRF alternatives is presented on **Table 5-11**. The replacement costs were inflated to reflect the costs in the year of replacement dollars. The replacement costs were then multiplied by the present worth factor in order to reflect the value in 2011 dollars. These costs are shown for the new pumps that are to be replaced in 2026 (15 year useful life), with this value in 2026 brought back on a present worth basis to 2011 dollars.

The salvage value the new pumps are presented on Table 5-11. The salvage values represent the value in the year of replacement and the present worth factor used reflects the value of these amounts in terms of 2011 dollars.

**Table 5-11. AWWRF Diversions - Present Worth of Replacement & Rehabilitation and Salvage Value**

<b>AWWRF DIVERSION TO SWWRF</b>	<b>Replacement Year</b>	<b>Table 5-3 Replacement Costs<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	\$2,850,819	0.2855	\$813,852
<b>Total Replacement Cost Value</b>		<b>\$2,850,819</b>		<b>\$813,852</b>
	<b>Replacement Year</b>	<b>Table 5-3 Salvage Value<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	(\$1,900,546)	0.2087	(\$396,596)
<b>Total Replacement &amp; Salvage Cost Value AWWRF Diversion to SWWRF<sup>c</sup></b>		<b>\$950,273</b>		<b>\$417,256</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>	<b>Replacement Year</b>	<b>Table 5-3 Replacement Costs<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
AWWRF R&R New Pumps and Meters	2026	\$4,230,018	0.2855	\$1,207,585
Additional pump at Pasadena PS	2026	145,766	0.2855	41,613
<b>Total Replacement Cost Value</b>		<b>\$4,375,784</b>		<b>\$1,249,198</b>
	<b>Replacement Year</b>	<b>Table 5-3 Salvage Value<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R Costs for New Pumps & Motors	2026	(\$2,820,012)	0.2087	(\$588,465)
R&R Costs for Pasadena Pumps & Motors	2026	(97,177)	0.2087	(\$20,278)
<b>Subtotal Salvage Cost Value</b>		<b>(\$2,917,189)</b>		<b>(\$608,743)</b>
<b>Total Replacement &amp; Salvage Cost Value AWWRF Diversion to SWWRF &amp; NWWRF<sup>c</sup></b>		<b>\$1,458,595</b>		<b>\$640,455</b>

<sup>a</sup> Replacement costs and Salvage Value taken from Table 5-3.

<sup>b</sup> Present worth equals the replacement cost or salvage value times the present worth factor.

<sup>c</sup> The totals equal the replacement costs and replacement cost present worth plus the salvage value and salvage value present worth.

The third step in the analysis was to calculate the present worth of the operation and maintenance costs. This calculation is presented for the AWWRF operational alternative on **Table 5-12**. The operation and maintenance costs represent the annual costs in 2011 dollars. The operation and maintenance costs were then multiplied by annual present worth factors that provide the present worth for a series of values for a twenty year period.

**Table 5-12. AWWRF Operational - Present Worth of Operation and Maintenance Costs**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 3% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
<b>AWWRF Operational</b>					
Existing O&M Costs	\$3,290,616	26.8704	\$88,420,083		\$43,058,765
Electricity - Reject Water Pumping	8,746	26.8704	234,999		114,440
Maintenance - Reject Water Pumping	26,780	26.8704	719,589		350,425
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$3,326,142</b>		<b>\$89,374,671</b>		
Rehab - Reject Water Pumps (2019 \$)	<b>\$26,095</b>	1.0000	<b>\$26,095</b>	0.4940	12,892
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Operational</b>					<b>\$43,536,522</b>

<sup>a</sup> O&M costs taken from Table 5-6.

<sup>b</sup> Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup> Present worth is the accumulation of the O&M costs from 2011 through 2030 times the present worth factor for each year.

This calculation is presented for the diversion of flow from AWWRF to the SWWRF alternative on **Table 5-13**. The operation and maintenance costs represent the annual costs in 2011 dollars. The operation and maintenance costs were then multiplied by annual present worth factors that provide the present worth for a series of values for a twenty year period.

**Table 5-13. AWWRF Diversion to SWWRF - Present Worth of Operation and Maintenance**

	<b>Table 5-6 Operation and Maintenance Costs 2011 \$<sup>a</sup></b>	<b>Compounding Factor at 3% Inflation</b>	<b>Cumulative Operation and Maintenance Costs<sup>b</sup></b>	<b>Present Worth Factors</b>	<b>Present Worth<sup>c</sup></b>
Electricity - AWWRF Pump Station	\$131,185	26.8704	\$3,524,992		\$1,716,599
Odor Control & Maint, - AWWRF	76,241	26.8704	2,048,613		997,633
Increased O&M Costs at SWWRF	1,408,194	26.8704	37,838,701		18,426,671
Land Lease Costs	94,875	26.8704	2,549,336		1,241,475
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$1,710,495</b>		<b>\$45,961,643</b>		
Rehab - Diversion Pumps (2019 \$)	<b>\$39,143</b>	1.0000	<b>\$39,143</b>	0.4940	19,338
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Diversion to SWWRF</b>					<b>\$22,401,715</b>

<sup>a</sup> O&M costs taken from Table 5-6.

<sup>b</sup> Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup> Present worth is the accumulation of the O&M costs from 2011 through 2030 times the present worth factor for each year.

This calculation is presented for the diversion of flow from AWWRF to the SWWRF/NWWRF alternative on **Table 5-14**. The operation and maintenance costs represent the annual costs in 2011 dollars. The operation and maintenance costs were then multiplied by annual present worth factors that provide the present worth for a series of values for a twenty year period.

**Table 5-14. AWWRF Diversion to SWWRF & NWWRF - Present Worth of Operation and Maintenance**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 3% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
Electricity - AWWRF Pump Station	\$135,489	26.8704	\$3,640,652		\$1,772,923
Odor Control & Maint. - AWWRF Pump Station	76,241	26.8704	2,048,613		997,633
Electricity - Pasadena Pump Station	25,792	26.8704	693,053		337,503
Increased O&M Costs at SWWRF & NWWRF	1,402,399	26.8704	37,682,999		18,350,847
Land Lease Costs	94,875	26.8704	2,549,336		1,241,475
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$1,734,797</b>		<b>\$46,614,654</b>		
Rehab - Diversion Pumps (2019 \$)	<b>\$39,143</b>	1.0000	<b>\$39,143</b>	0.4940	19,338
Rehab - Pasadena Pump (2019 \$)	<b>\$13,048</b>	1.0000	<b>\$13,048</b>	0.4940	6,446
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Diversion to SWWRF &amp; NWWRF</b>					<b>\$22,726,164</b>

<sup>a</sup> O&M costs taken from Table 5-6.

<sup>b</sup> Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup> Present worth is the accumulation of the O&M costs from 2010 through 2030 times the present worth factor for each year.

## 5.8 Comparison of Present Worth Summaries

Table 5-15 presents a comparison of the present worth summaries for all three alternatives.

**Table 5-15. Present Worth Summary**

	AWWRF OPERATIONAL - Present Worth for Study Period	AWWRF DIVERSION TO SWWRF Present Worth for Study Period	AWWRF DIVERSION TO SWWRF AND NWWRF Present Worth for Study Period
<b>Capital Costs</b>			
New Capital Costs - Net of Salvage Value <sup>a</sup>	\$11,051,955	\$28,929,774	\$35,679,934
Replacement (CIP) Costs Net of Salvage Value <sup>b</sup>	29,556,306	417,256	640,455
Operation & Maintenance Costs <sup>c</sup>	43,536,522	22,401,715	22,726,164
<b>Total Present Worth Option 1</b>	<b>\$84,144,783</b>	<b>\$51,748,745</b>	<b>\$59,046,553</b>

<sup>a</sup> Taken from Tables 5-7, 5-8, 5-9.

<sup>b</sup> Taken from Tables 5-10, 5-11.

<sup>c</sup> Taken from Tables 5-12, 5-13, 5-14.

In addition to the present worth analysis, another way of looking at the comparison is on a cash flow basis. **Table 5-16** presents a comparison of these alternatives from a cash flow perspective. The capital costs for the AWWRF operational alternative are for the period of 2011 through 2015, or a traditional five-year CIP period. All costs are in 2011 dollars. While the diversion alternatives do not pay for themselves, they are less expensive than the alternative to keep AWWRF operational.

**Table 5-16. AWWRF and Diversions Annual Cash Flow**

	AWWRF OPERATIONAL	AWWRF DIVERSION TO SWWRF	AWWRF DIVERSION TO SWWRF AND NWWRF
Capital Costs - New <sup>a</sup>			
New Capital Costs - 2011 \$	\$9,843,195	\$30,449,890	\$38,456,080
Land	4,900,000		
Demolition Costs	-	3,553,500	3,553,500
Capital Costs - Replacement (CIP) <sup>b</sup>			
2011	11,237,000.00		
2012	3,980,000.00		
2013	5,795,000.00		
2014	3,790,000.00		
2015	3,460,000.00		
Total	\$43,005,195	\$34,003,390	\$42,009,580
Annual Debt Service (5%,20 yrs.) <sup>c</sup>	\$3,450,848	\$2,728,520	\$3,370,957
Change in O&M Costs <sup>d</sup>	\$35,526	(\$1,580,121)	(\$1,555,819)
Annual Cash Increase (Decrease)	\$3,486,374	\$1,148,399	\$1,815,139
Annual Savings from Diversion		\$2,337,975	\$1,671,235

<sup>a</sup> Taken from Table 5-1.

<sup>b</sup> Taken from Table 5-4 – Years 2011 thru 2015.

<sup>c</sup> Equals debt service on total capital costs with 20-year repayment at 5%.

<sup>d</sup> AWWRF Operational costs equal the electricity & maintenance costs for the reject water pump station in 2011\$ on Table 5-6. AWWRF Diversion to SWWRF equals Table 5-6 O&M costs for SWWRF (\$1,710,495) less existing O&M AWWRF (3,290,616). AWWRF Diversion to SWWRF and NWWRF equals Table 5-6 O&M costs for SWWRF and NWWRF (\$1,734,797) less existing O&M AWWRF (3,290,616).

# Section 6

## Conclusions and Recommendations

### 6.1 Conclusions and Recommendations

In accordance with the authorization received from the City, the previous sections of this report estimate and detail the comparison of present worth of three alternatives based on marginal costs. The three alternatives compared in this study (and presented in this report) include:

- Keep AWWRF Operational
- Flow Diversion to SWWRF (and AWWRF out-of-service/demolished)
- Flow split and diversion to both SWWRF and NWWRF (and AWWRF out-of-service/demolished)

The main driver for this evaluation was the requirement by the FDEP for City to manage their reject water via reject water storage (and subsequent re-treatment) rather than direct disposal via the existing injection wells. This new reject storage will not only have to be built and operated, adding significant costs to the City, but will also have to be located off-site owing to space limitations at the existing facility location. Because of these and other reliability concerns discussed in this report, the City decided to also evaluate flow diversion alternatives in addition to the continued operations and maintenance of the aging AWWRF.

This report presents a summary of the data utilized for the development of potential flow diversion alternatives, further development of capital, operation, and maintenance costs for each of the three final alternatives, performance of a present worth cost analysis, and comparison of the alternatives.

A 20-year study period (FY 2011 through FY 2030) was utilized for the estimation of costs and data related to the present worth analysis and comparison. For capital costs including both new and R&R costs, a salvage value was estimated for the asset at the end of the study period. The present worth of this salvage value was included as a credit (negative cost) in the overall present worth analysis for each alternative. The purpose for including salvage value in the analysis is to make all of the alternatives “equivalent” since many of the assets have useful lives that extend beyond the study period.

**Table 6-1** presents a comparison of the present worth summaries for all three alternatives.

**Table 6-1. Present Worth Summary**

	<b>AWWRF OPERATIONAL - Present Worth for Study Period</b>	<b>AWWRF DIVERSION TO SWWRF Present Worth for Study Period</b>	<b>AWWRF DIVERSION TO SWWRF AND NWWRF Present Worth for Study Period</b>
<b>Capital Costs</b>			
New Capital Costs (Minus Salvage Value)	\$12,699,445	\$31,194,252	\$38,505,008
Replacement (CIP) Costs (Minus Salvage Value)	29,556,306	417,256	640,455
Operation & Maintenance Costs	43,536,522	22,401,715	22,726,164
<b>Total Present Worth</b>	<b>\$85,792,273</b>	<b>\$54,013,223</b>	<b>\$61,871,628</b>

In this comparison, the difference in present worth between keeping AWWRF operational and flow diversion to SWWRF is almost 60 percent and the difference in present worth between keeping AWWRF operational and flow diversion to SWWRF and NWWRF is almost 40 percent.

Therefore, from this study and based on present worth comparison, proceeding with either flow diversion to SWWRF or flow diversion to SWWRF and NWWRF would be the better choice for the City over continued operations at the AWWRF.

Present worth for flow diversion to SWWRF and NWWRF is approximately 15 percent higher than flow diversion to SWWRF alone due to the higher initial capital costs for this alternative. However, flow diversion to SWWRF and NWWRF provides the City with greater reliability and flexibility to deal with future flows. This type of reliability and flexibility is not normally designed into most Florida municipal wastewater facilities. Therefore, the additional costs may not be justified.

It is recommended that the City proceed with the conceptual design of flow diversion using SWWRF as the receiving facility.

## **6.2 Other Factors and Additional Considerations**

Although the focus of this evaluation study was a marginal cost based comparison using present worth methodology, some non-economic considerations would also support the recommendation included in the previous section. These are listed below.

### **6.2.1 Reliability Issues**

AWWRF is the oldest wastewater treatment facility owned by the City of St. Petersburg. Therefore, this is the most fragile plant with equipment and structures operating at or beyond their design useful life. In addition, the plant processes are becoming antiquated and will soon reach their technical obsolescence. Also, some of

the older electrical and mechanical equipment are installed under the 100-year floodplain, thus susceptible to storm surges.

In essence, the reliability of the current equipment and facility processes can be expected to quickly degrade in the future. These reliability issues would support the recommendation to divert flow from and decommission the AWWRF.

### **6.2.2 Expandability Issues**

AWWRF is located on a limited footprint with constraints on both horizontal and vertical expansion. In fact, as discussed in this study, there is no room on-site to locate the newly required reject storage tank(s), which, therefore, have to be located at quite some distance from the facility at additional pumping, piping and storage cost. Any future expansion needs may meet with similar requirements for off-site location. This has impacts on additional staffing needs, need for SCADA controls and lack of efficiency in plant operations which will increase the cost to construct, operate and maintain these new facilities.

### **6.2.3 Regulatory Considerations**

One of the drivers behind the current study was the regulatory requirement pertaining to management of reject water at AWWRF. On-site constraints forced these facilities to be located off-site, as discussed. As the regulatory environment continues to tighten, it is possible that other similar considerations in the future may continue to constrain compliant operations at the facility site posing additional burden to acquire additional land in the future.

### **6.2.4 Sustainability**

In today's world sustainable considerations for facilities designs and operations are being considered everywhere. Consolidation of AWWRF with SWWRF allows for a more efficient operation through reduced land use, consolidation of personnel and overall reduction in carbon footprint.

### **6.2.5 Permitted Capacity**

With the flow diversion alternatives, which would eliminate the AWWRF, the permitted treatment capacity associated with the AWWRF of 12.4 MGD would be lost and probably never be re-gained. The current total permitted treatment capacity of 68.4 MGD would be reduced to 56 MGD. However, as presented in Section 2 of this report, the total projected flows for the City in the year 2030 are estimated at approximately 38.1 MGD which are well within the reduced available total permitted capacity of 56 MGD that would result with the elimination of the AWWRF.

## **Appendix A**

**Data Provided by City of St. Petersburg**

**Lowe, Karen**

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**From:** David Abbaspour [David.Abbaspour@stpete.org]  
**Sent:** Wednesday, June 02, 2010 2:49 PM  
**To:** Thomas Gibson  
**Cc:** Lowe, Karen; Pangasa, Vipin; Steve Leavitt  
**Subject:** Re: AWWRF Reject tank site

Thanks,

David Abbaspour

City of St. Petersburg  
Engineering Department  
[David.Abbaspour@stpete.org](mailto:David.Abbaspour@stpete.org)  
(727) 892-5382

>>> Thomas Gibson 6/2/2010 11:07 AM >>>  
Bruce Grimes found a vacant mobile home park 15 acre site, on MLK Street S near 32 ave S for \$4.9 m. This cost would be the lowest we could anticipate finding.

**Lowe, Karen**

---

**From:** David Abbaspour [David.Abbaspour@stpete.org]  
**Sent:** Thursday, August 05, 2010 10:39 AM  
**To:** Lowe, Karen  
**Cc:** Pangasa, Vipin  
**Subject:** Fwd: AWWRF Asset / CIP Spreadsheet  
**Attachments:** AWWRF\_Equipment\_CIP\_Data.XLS; AWWRF Old CIP Plan .XLSX; Charles Wise.vcf

FYI.

David Abbaspour

City of St. Petersburg  
Engineering Department  
[David.Abbaspour@stpete.org](mailto:David.Abbaspour@stpete.org)  
(727) 892-5382

>>> Charles Wise 8/5/2010 9:10 AM >>>

David,

In response to your request.

Attached are files that provide some of the answers that CDM is looking for in their review of asset life cycles and CIP funding for AWWRF.

One of the files is their spreadsheet modified to reflect service histories as provided by Randy Curtis, Frank Niles and Randy Miller. The second attachment is an excerpt from an old CIP plan showing 15 years, out to the year 2022. I don't think we have any plans that go beyond that. I'll continue to look for additional documentation, but I wanted to get this to you so that it can be forwarded for review.

Give me a call if you have any questions.

Thank you,

CRW

Charlie Wise  
City of St. Petersburg  
Projects Coordinator  
727 892-5687

COST SCHEDULE ( \$000s Omitted )

PROJECT TITLE	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	TOTAL
<b>SE/AW WRF Plant 1</b>																
Clarifier #1 & #2 Modification	2,600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,600
Clarifier #3 & #4 Modification	2,600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,600
Return Sludge Replacement	60	60	0	0	0	0	0	0	0	0	60	60	0	0	0	240
Final Distribution Pump Replacement	0	0	0	80	80	80	80	0	0	0	0	0	0	0	0	320
Low head Pump/Motor Replacement	60	60	60	60	0	0	0	0	0	0	0	0	60	60	60	420
Rebuild Fine Barscreens #1 & #2	0	0	0	200	200	0	0	0	0	0	200	0	0	0	0	600
New Aerator Gear Box (2)	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120
Aerator Gear Box Rebuild (6)	0	65	65	65	0	0	0	0	0	0	0	0	0	0	0	195
Digester Mixer Replacement	0	0	0	300	300	300	0	0	0	0	0	0	0	0	0	900
Headworks Rehab	0	0	0	0	300	0	0	0	0	0	0	0	0	0	0	300
Filter Rebuild/Rehab	120	120	120	0	0	0	0	0	0	0	120	120	120	0	0	720
Influent Pump & VFD Replacement	130	130	0	0	0	0	0	0	0	0	0	130	130	0	0	520
Digester Cover Replacement	0	0	0	1,200	0	0	0	1,200	0	0	0	0	0	0	0	2,400
Biosolids Dewatering Replacement	0	0	0	150	3,000	0	0	0	0	0	0	0	0	0	0	3,150
Polymer Unit Replacement	0	150	0	0	0	0	0	0	0	0	0	150	0	0	0	300
GBT Replacement	0	0	0	0	0	0	0	0	0	1,000	0	0	0	0	0	1,000
Generator Addition	0	150	1,500	0	0	0	0	0	0	0	0	0	0	0	0	1,650
Difused Aeration	0	0	0	0	0	0	0	5,000	0	0	0	0	0	0	0	5,000
New GBT	0	0	0	0	0	1,500	0	0	0	0	0	0	0	0	0	1,500
CCC Expansion	0	0	0	0	100	850	0	0	0	0	0	0	0	0	0	950
Waste Sludge Pump Replacement	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	100
Admin Building Rehab	0	0	0	0	0	300	3,000	0	0	0	0	0	0	0	0	3,300
Influent Pump Station	0	1,800	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800
SCADA Phase 2	0	0	300	0	0	0	0	0	0	0	0	0	300	0	0	600

<u>PROJECT TITLE</u>	<u>CHANGE</u>	<u>REASON</u>
<b>Water Treatment and Distribution</b>		
<u>Cosme WT Plant</u>		
Ground Storage Tank & Valves	4,400,000	Moved up previously scheduled in FY12, was FY09 project that was cut
Aeration Basins Coating	0	Pushed out was previously scheduled for FY's 11 & 12
Enhanced Water Treatment (Phase 2)	0	Moved up, was previously scheduled in FY's 13 & 14
Enhanced Hurricane Shutters	0	Pushed out was previously scheduled for FY's 13 & 14
Gravity Sludge Thickener Drive Unit Replacement	264,000	Was FY09 project that was cut added construction \$
Gulf to Bay MCC/Electrical Switchgear Rehab	389,000	Was FY09 project that was cut added construction \$
Roof Evaluation/Rehab	840,000	Was FY09 project that was cut added construction \$
Vulnerability Assess Recom-Basin Security Cvr's	1,070,000	New project
<b>Subtotal</b>	<b>6,963,000</b>	
<u>Oberly Pumping Station</u>		
Storage Tank Valves Replacement	0	Pushed out was intially scheduled for FY's 13 & 14
Facility Hardening/Flood/Wind Replacement	1,381,000	Construction \$ for FY 15
Roof Evaluation/Rehab	(105,000)	Reprioritized pushed out past FY15
<b>Subtotal</b>	<b>1,276,000</b>	
<u>Washington Terrace Pumping Station</u>		
Storage Tank Valves Replacement	(100,000)	Pushed out intially scheduled for FY's 13 & 14; reduced \$100k
Header/Discharge Valves Replacement	53,000	Construction \$ for FY 15
<b>Subtotal</b>	<b>(47,000)</b>	
<b>Total Change Water Treatment &amp; Distribution</b>	<b>8,192,000</b>	

### **Water Systems Maintenance**

<u>Water Maintenance</u>		
PC Belcher Rd 38 Avenue & 54 A/N	(60,000)	Moved to Tech FY's 10 & 11
PC 62nd A/N 49th St to 34th St	(50,000)	Moved to Tech FY's 11 & 12; \$25k/yr
FDOT US19/Whitney Road	(5,111,000)	Moved to Tech FY's 11, 12 & 13
Pasadena Water Main Improvements	(250,000)	Moved to Tech FY 14
Bay Pines Water Main Improvements	(380,000)	Moved to Tech FY 12
Pinellas Bayway Bridge Utility Relocation	(114,000)	Moved to Tech FY 14
Aqueous Bridge Crossings	1,020,000	Reallocated \$ between years & increased overall \$1mil 20 k
PC Valve & MH Replacement	(200,000)	Moved to Tech FY's 11,12, 13 & 14; \$50k/yr
Bridge Crossing over Booker Creek	0	New Moved to Tech
Bridge Crossing over Salt Creek	(20,000)	Moved to Tech FY 12
Bridge Crossing Overlook Dr NE east	(30,000)	Moved to Tech FY 13
PC 22nd Avenue South	(120,000)	Moved to Tech FY's 11 & 12
New Water Main Extensions	50,000	Construction \$ for FY 15
PW Service Taps, Meters & Backflows	275,000	Construction \$ for FY 15
PW Backflow Prevention	450,000	Construction \$ for FY 15
PW Meter Replacement	740,000	Construction \$ for FY 15
PW Main Replacement	2,500,000	Construction \$ for FY 15
PW Main Relocation	150,000	Construction \$ for FY 15
Water Main Valve Replacement	50,000	Construction \$ for FY 15
<b>Subtotal Change Water Maintenance</b>	<b>(1,100,000)</b>	
<u>Reclaimed Water</u>		
(NEW) Reclaim Extensions	250,000	New project FY11
NE Area PCCP Replacement Phase 2-3B	0	Pushed out was intially scheduled for FY12
Bridge Crossing Overlook Drive NE	(20,000)	Moved to Tech FY13
New Reclaimed Water Service Taps & Backflows	75,000	Construction \$ for FY 15

RW Main Replacement FY10	50,000
RW Main Valve Replacement	50,000
<b>Subtotal Change Reclaimed</b>	<b>405,000</b>
<b>Total Change Water Systems Maintenance</b>	<b>(695,000)</b>

Construction \$ for FY 15  
Construction \$ for FY 15

**Water Reclamation Facilities**

SE/AW WRF Plant 1

In-Plant Lift Station	(250,000)	Reprioritized pushed out past FY15	
Return Sludge Replacement	(120,000)	Reprioritized pushed out past FY15	
Rebuild Fine Barscreens #1 & #2	0	Reprioritized pushed out past FY15	
Low head Pump/Motor Replacement	(70,000)	Moved up and reduced was \$85k in FY's 11 & 13	
Digester Mixer Replacement	(200,000)	Reduced by \$300,000 overall; \$100k each year	-200000
Effluent Filter Rehab 6 Filters	(240,000)	Pushed out and increased was 120k budgeted for FY's 11 & 12	
Polymer Unit Replacement	(150,000)	Reprioritized pushed out past FY15	
SCADA Phase 2	(250,000)	For budget planning deleted at this time	
AWWRF Side Stream Lift Station	0	New project; for budget planning deleted at this time	
Replace Influent Pumps	120,000	New project	60000
Aerator Gear Box Rebuild (6)	(65,000)	Pushed out and increased was \$65k in FY's 11 & 13	
Digester Cover Replacement	(750,000)	Pushed out and increased \$1 million \$750k budgeted FY12	
Biosolids Dewatering Replacement	110,000	Moved up and increased was initially \$150k scheduled for FY 14	
New Aerator Gear Box (2)	100,000	New project	100000
Filter Control Rehab			
Effluent Disinfection Basin Replacement	1,000,000	New project	
Rebuild/Rehab Influent Pumping Station	0	New project; for budget planning deleted at this time	
Final Distribution Pump Replacement	300,000	New project	
Digester Mixer Replacement	(300,000)	Reduced by \$300,000 overall; \$100k each year	
Generator Addition	0	New project for FY12; for budget planning deleted at this time	
CCC Expansion	(100,000)	Reprioritized pushed out past FY15	
Waste Sludge Pump Replacement	(100,000)	Reprioritized pushed out past FY15	
	<u>(965,000)</u>		

Contact:  
 Phone:

CIP Fund #	GovMax #	PROJECT TITLE	10	11	12	13	14	15	16	17	18	19	TOTAL
<b>Water Treatment and Distribution</b>													
<b>Cosme WT Plant</b>													
4003	42009003	Ground Storage Tank & Valves	0	4,400,000	0	0	0	0	0	0	0	0	4,400,000
4003	42008003	Instrumentation & Console Upgrades	0	300,000	0	2,700,000	0	0	0	0	0	0	3,000,000
4003	4200802	HS Pump #6/ AFD/HS Pumps 2,3 & 4	0	450,000	0	3,300,000	0	0	0	0	0	0	3,750,000
4003	42009007	Laboratory Rehab	0	53,000	361,000	0	0	0	0	0	0	0	414,000
4003	42009009	Aeration Basins Coating	0	0	0	54,000	393,000	0	0	0	0	0	447,000
4003	42009010	Filter Building - Structural Upgrades	0	126,000	0	0	0	0	0	0	0	0	126,000
4003	42009011	Chemical & Chlorine Bldg - Structural Upgrades	0	137,000	0	0	0	0	0	0	0	0	137,000
4003	42001115	Cosme Header & Sequence Valves	0	0	4,400,000	0	0	0	0	0	0	0	4,400,000
4003	42008109	Enhanced Water Treatment (Phase 2)	0	0	500,000	2,200,000	0	0	0	0	0	0	2,700,000
4003	42009008	Enhanced Hurricane Shutters	0	0	0	0	53,000	203,000	0	0	0	0	256,000
4003	42009004	Vulnerability Assess Recom-Security Surveillance	0	0	0	0	250,000	0	0	0	0	0	250,000
4003	42009006	Gravity Sludge Thickener Drive Unit Replacement	0	0	0	0	53,000	264,000	0	0	0	0	317,000
4003	42009012	Gulf to Bay MCC/Electrical Switchgear Rehab	0	0	0	0	63,000	389,000	0	0	0	0	452,000
4003	42009013	Vulnerability Assess Recom-Fencing/Lighting	0	0	0	0	255,000	0	0	0	0	0	255,000
4003	42009014	Roof Evaluation/Rehab	0	0	0	0	53,000	840,000	0	0	0	0	893,000
4003	42009015	Filter Media Evaluation/Renew	0	0	0	0	21,000	525,000	0	0	0	0	546,000
4003	42009016	Polymer Feed Equipment Replacement	0	0	0	0	172,000	0	0	0	0	0	172,000
4003	4201156	Vulnerability Assess Recom-Basin Security Cvr	0	0	0	0	300,000	770,000	0	0	0	0	1,070,000
<b>Total</b>			<b>0</b>	<b>5,466,000</b>	<b>5,261,000</b>	<b>8,254,000</b>	<b>1,613,000</b>	<b>2,991,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>23,585,000</b>
<b>Oberly Pumping Station</b>													
4003	42009017	Doors/Windows/Hurricane Shutters	0	140,000	0	0	0	0	0	0	0	0	140,000
4003	42009019	Building Rehab	0	53,000	329,000	0	0	0	0	0	0	0	382,000
4003	42009018	Storage Tank Valves Replacement	0	0	0	0	53,000	156,000	0	0	0	0	209,000
4003	42009021	Storage Tanks Evaluations	0	0	0	0	125,000	0	0	0	0	0	125,000
4003	42009022	Facility Hardening/Flood/Wind Replacement	0	0	0	0	207,000	1,381,000	0	0	0	0	1,588,000
4003	42009200	Roof Evaluation/Rehab	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Emergency Generator #2	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>			<b>0</b>	<b>193,000</b>	<b>329,000</b>	<b>0</b>	<b>385,000</b>	<b>1,537,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,444,000</b>
<b>Washington Terrace Pumping Station</b>													
4003	42009025	Main Building- Structural Upgrades	0	161,000	0	0	0	0	0	0	0	0	161,000
4003	42009023	Storage Tank Valves Replacement	0	0	0	0	40,000	140,000	0	0	0	0	180,000
4003	42009028	Facility Hardening/Flood/Wind Replacement	0	0	0	165,000	1,262,000	0	0	0	0	0	1,427,000
4003	42009024	Header/Discharge Valves Replacement	0	0	0	0	79,000	53,000	0	0	0	0	132,000
4003	42009027	Storage Tank Evaluation	0	0	0	0	177,000	0	0	0	0	0	177,000
<b>Total</b>			<b>0</b>	<b>161,000</b>	<b>0</b>	<b>165,000</b>	<b>1,558,000</b>	<b>193,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,077,000</b>
<b>Water Treatment and Distribution Grand Total</b>			<b>0</b>	<b>5,820,000</b>	<b>5,590,000</b>	<b>8,419,000</b>	<b>3,556,000</b>	<b>4,721,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28,106,000</b>

Contact:  
 Phone:

CIP Fund #	GovMax #	PROJECT TITLE	10	11	12	13	14	15	16	17	18	19	TOTAL
<b>Water Systems Maintenance</b>													
<b>Water Maintenance</b>													
4003	4201101	New Water Main Extensions	50,000	50,000	50,000	50,000	50,000	50,000	0	0	0	0	300,000
4003	4201102	PW Service Taps, Meters & Backflows	275,000	275,000	275,000	275,000	275,000	275,000	0	0	0	0	1,650,000
4003	4201103	PW Backflow Prevention	325,000	350,000	375,000	400,000	425,000	450,000	0	0	0	0	2,325,000
4003	4201104	PW Meter Replacement	640,000	660,000	680,000	700,000	720,000	740,000	0	0	0	0	4,140,000
4003	4201105	PW Main Replacement	1,850,000	2,000,000	2,000,000	2,500,000	2,500,000	2,500,000	0	0	0	0	13,350,000
4003	4201106	PW Main Relocation	150,000	150,000	150,000	150,000	150,000	150,000	0	0	0	0	900,000
4003	4201107	Water Main Valve Replacement	50,000	50,000	50,000	50,000	50,000	50,000	0	0	0	0	300,000
4003	4201115	Aqueous Bridge Crossings	0	120,000	400,000	0	1,000,000	1,000,000	0	0	0	0	2,520,000
<b>Total</b>			<b>3,340,000</b>	<b>3,655,000</b>	<b>3,980,000</b>	<b>4,125,000</b>	<b>5,170,000</b>	<b>5,215,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>25,485,000</b>
<b>Reclaimed Water</b>													
4003	4201108	New Reclaimed Water Service Taps & Backflows	100,000	75,000	75,000	75,000	75,000	75,000	0	0	0	0	475,000
4003	4201153	RW Main Replacement FY10	50,000	50,000	50,000	50,000	50,000	50,000	0	0	0	0	300,000
4003	4201154	RW Main Valve Replacement	0	50,000	0	50,000	0	50,000	0	0	0	0	150,000
4003	n/a	Progress Energy Bartow Plant (#12137 - FY09)	0	0	0	0	0	0	0	0	0	0	0
4003	11116	NE Area PCCP Replacement Phase 2-3B	0	0	0	0	0	4,000,000	0	0	0	0	4,000,000
4003	42012129	RW Flushing Appurtenance	0	0	50,000	0	50,000	0	0	0	0	0	100,000
4003	4201155	(NEW) Reclaim Extensions	0	250,000	0	0	0	0	0	0	0	0	250,000
<b>Total</b>			<b>150,000</b>	<b>425,000</b>	<b>175,000</b>	<b>175,000</b>	<b>175,000</b>	<b>4,175,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5,275,000</b>
<b>Water Maintenance Grand Total</b>			<b>3,490,000</b>	<b>4,080,000</b>	<b>4,155,000</b>	<b>4,300,000</b>	<b>5,345,000</b>	<b>9,390,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30,760,000</b>
<b>Water Reclamation Facilities</b>													
<b>SE/AW WRF Plant 1</b>													
4003	42001116	AWWRF Side Stream Lift Station	0	0	0	0	0	0	0	0	0	0	0
	4201160	Process Equipment Replacement	0	310,000	580,000	570,000	300,000	460,000	0	0	0	0	2,220,000
4003	n/a	Effluent Disinfection Basin Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	42009055	Rehab Effluent Filters #1 - #3	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Rehab/Rebuild Influent Pumping Station	0	0	0	0	0	0	0	0	0	0	0
4003	42009056	Digester No. 1 Cover Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Rehab Effluent Filters #4 - #6	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Replace Influent Pumps (1 per year)	0	0	0	0	0	0	0	0	0	0	0
4003	42009050	Return Sludge Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Final Distribution Pump Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	42009052	Low Head Pump/Motor Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	42009051	Rebuild Fine Barscreens #1 & #2	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	New Aerator Gear Box (2)	0	0	0	0	0	0	0	0	0	0	0
4003	42009053	Aerator Gear Box Rebuild (6)	0	0	0	0	0	0	0	0	0	0	0
4003	42009054	Digester Mixer Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Headworks Rehab	0	0	0	0	0	0	0	0	0	0	0
4003	42009057	Biosolids Dewatering Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	42009058	Polymer Unit Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	GBT Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Generator Addition	0	0	0	0	0	0	0	0	0	0	0
4003	42009061	SCADA Phase 2	0	0	0	0	0	0	0	0	0	0	0
<b>Total SE</b>			<b>0</b>	<b>310,000</b>	<b>580,000</b>	<b>570,000</b>	<b>300,000</b>	<b>460,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,220,000</b>

FORM CR - 1  
 CAPITAL IMPROVEMENT PROGRAM PLAN  
 PROJECT RANKING  
 FY 2011-2015

PUBLIC WORKS  
 WATER RESOURCES

Contact:  
 Phone:

CIP Fund #	GovMax #	PROJECT TITLE	10	11	12	13	14	15	16	17	18	19	TOTAL
<b>NE WRF Plant 2</b>													
4003	42009062	Digester #3 Cover Replacement	0	1,500,000	0	0	0	0	0	0	0	0	1,500,000
4003	42009067	Dewatering Imp. (Belt-Filter Press Replacements)	0	1,000,000	0	0	0	0	0	0	0	0	1,000,000
4003	42009064	Digester #2 Cover Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	4201462	Plant Road Paving	0	0	0	0	250,000	0	0	0	0	0	250,000
4003	4201261	Electrical Rehab - Phase 1/5 on Influent	0	0	500,000	0	0	0	0	0	0	0	500,000
4003	4201361	Electrical Rehab - Phase 2/5 on the Old Plant	0	0	0	500,000	0	0	0	0	0	0	500,000
4003	4201461	Electrical Rehab - Phase 3/5 Aeration	0	0	0	0	500,000	0	0	0	0	0	500,000
4003	4201561	Electrical Rehab - Phase 4/5 Filters	0	0	0	0	0	500,000	0	0	0	0	500,000
4003	n/a	Electrical Rehab - Phase 5/5 Dist	0	0	0	0	0	0	500,000	0	0	0	500,000
4003	42009070	Clarifier Modification #3 & #4	0	0	0	0	0	0	0	5,000,000	0	0	5,000,000
4003	4201463	Clarifier #4 Mechanical Rehab	0	0	0	0	100,000	0	0	0	0	0	100,000
4003	4201161	Roof Replacements	0	100,000	0	0	0	0	0	0	0	0	100,000
4003	4201262	Clarifier #5 Launder Cover	0	0	100,000	0	0	0	0	0	0	0	100,000
4003	42009073	Distribution Generator Replacement	0	0	0	1,000,000	0	0	0	0	0	0	1,000,000
4003	42009074	Filter Building	0	0	0	0	0	0	0	0	0	0	0
4003	42009075	Aerator Generator Replacement	0	0	0	0	1,000,000	0	0	0	0	0	1,000,000
4003	42009076	Aerator Gearbox Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	Replacement of Distribution Facility	0	0	0	0	0	0	6,000,000	0	0	0	6,000,000
4003	4201563	Filter Feed Pump Replacements	0	0	0	0	0	60,000	60,000	60,000	0	0	180,000
<b>Total NE</b>			<b>0</b>	<b>2,600,000</b>	<b>600,000</b>	<b>1,500,000</b>	<b>1,850,000</b>	<b>560,000</b>	<b>6,560,000</b>	<b>5,060,000</b>	<b>0</b>	<b>0</b>	<b>18,730,000</b>
<b>NW WRF Plant 3</b>													
4003	42009078	Electrical Improvements	0	0	2,750,000	0	0	0	0	0	0	0	2,750,000
4003	42009081	Headwork's Screening Structure & Odor Control	0	0	0	2,750,000	0	0	0	0	0	0	2,750,000
4003	42009083	Odor Control Phase 2 (Biosolids Handling Facilities)	0	0	0	0	1,000,000	0	0	0	0	0	1,000,000
4003	42009077	Return Sludge Pump Replacements	0	500,000	0	0	0	0	0	0	0	0	500,000
4003	n/a	Clarifier #2 Internal Structure Replacement	0	0	0	0	0	0	0	200,000	1,200,000	0	1,400,000
4003	42009080	Aeration Phase 2 (North Tank)	0	0	0	0	0	0	3,000,000	0	0	0	3,000,000
4003	42009084	Digester #1 Rehab	0	0	0	0	0	1,000,000	0	0	0	0	1,000,000
4003	42009085	Digester #3 Rehab	0	0	0	0	0	0	0	0	0	0	0
4003	4201162	Recycle Pump Station Pump Replacement	0	50,000	0	0	0	0	0	0	0	0	50,000
4003	42009094	Filter #6 Rehab	0	0	0	0	0	0	250,000	0	0	0	250,000
4003	42009095	SCADA Phase 2	0	0	0	1,000,000	0	0	0	0	0	0	1,000,000
<b>Total NW</b>			<b>0</b>	<b>550,000</b>	<b>2,750,000</b>	<b>3,750,000</b>	<b>1,000,000</b>	<b>1,000,000</b>	<b>3,250,000</b>	<b>200,000</b>	<b>1,200,000</b>	<b>0</b>	<b>13,700,000</b>

Contact:  
 Phone:

CIP Fund #	GovMax #	PROJECT TITLE	10	11	12	13	14	15	16	17	18	19	TOTAL
<b>SW WRF Plant 4</b>													
4003	4201163	GBT/Sludge Hldg Tank Odor Cont. & GBT Elec. Imp.	0	1,600,000	0	0	0	0	0	0	0	0	1,600,000
4003	42009096	Digester #2 Cover Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	4201164	Diffused Aeration Conv., Phase I, W. Basin & Blower Bldg	0	4,000,000	0	0	0	0	0	0	0	0	4,000,000
4003	4201165	Switchboard 1 Replacement	0	100,000	0	0	0	0	0	0	0	0	100,000
4003	4201263	Replace G-3 Generator Replacement	0	0	610,000	0	0	0	0	0	0	0	610,000
4003	4201264	Diffused Aeration Conv., Phase II, E. Basin & Effluent Filter Valve Repl.	0	0	4,350,000	0	0	0	0	0	0	0	4,350,000
4003	4201265	G-O Generator Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	4201166	Replace G-2 Generator Replacement	0	640,000	0	0	0	0	0	0	0	0	640,000
4003	4201266	Replace MCC-4B	0	0	100,000	0	0	0	0	0	0	0	100,000
4003	4201362	Replace ATS-1 & MCC-1, MCC-1A & MCC-1B	0	0	0	300,000	0	0	0	0	0	0	300,000
4003	42009097	Digester #1 Cover Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	4201464	Backwash Filter Pump Replacement	0	0	0	0	100,000	0	0	0	0	0	100,000
4003	4201465	Control Building Roof Replacement	0	0	0	0	150,000	0	0	0	0	0	150,000
4003	4201564	SCADA Upgrades	0	0	0	0	0	1,000,000	0	0	0	0	1,000,000
4003	n/a	Digester #3 Cover Replacement	0	0	0	0	0	0	0	0	0	0	0
4003	4201565	Headworks Rehab Recoating	0	0	0	0	0	50,000	0	0	0	0	50,000
<b>Total SW</b>			<b>0</b>	<b>6,340,000</b>	<b>5,060,000</b>	<b>300,000</b>	<b>250,000</b>	<b>1,050,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13,000,000</b>
<b>Water Reclamation Facilities Grand Total</b>			<b>0</b>	<b>9,800,000</b>	<b>8,990,000</b>	<b>6,120,000</b>	<b>3,400,000</b>	<b>3,070,000</b>	<b>9,810,000</b>	<b>5,260,000</b>	<b>1,200,000</b>	<b>0</b>	<b>47,650,000</b>
<b>Lift Stations</b>													
4003	42009106	Generator/Transfer Switches	0	100,000	0	0	0	0	0	0	0	0	100,000
4003	42009108	LS # 1 Sunrise Drive Rehab	0	0	700,000	0	0	0	0	0	0	0	700,000
4003	42009111	LS #11 Rehab	0	0	0	0	53,000	360,000	0	0	0	0	413,000
4003	42009109	LS #17 Rehab	0	0	0	225,000	0	0	0	0	0	0	225,000
4003	42009110	LS #30 Rehab - Pinellas Point	0	0	0	40,000	400,000	0	0	0	0	0	440,000
4003	4201157	LS #42 Improvements (Jim Walters)	0	0	0	0	0	1,000,000	0	0	0	0	1,000,000
4003	4201158	LS #42 Pump Replacement	0	60,000	0	0	0	0	0	0	0	0	60,000
4003	42009107	LS #53 Twin Brooks	0	100,000	0	0	0	0	0	0	0	0	100,000
4003	42009115	LS #62 Bartlett Park Improvements	0	0	0	0	0	0	0	0	0	0	0
4003	4201159	LS #62 Rehab. Bartlett Park Master	0	0	0	0	0	500,000	0	0	0	0	500,000
4003	42009114	LS #63 Northeast Master Improvements	0	150,000	0	0	0	1,500,000	0	0	0	0	1,650,000
4003	42009031	LS #75 Upgrade Carillon	0	250,000	0	0	0	0	0	0	0	0	250,000
<b>Lift Stations Grand Total</b>			<b>0</b>	<b>660,000</b>	<b>700,000</b>	<b>265,000</b>	<b>453,000</b>	<b>3,360,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5,438,000</b>

Contact:  
 Phone:

CIP Fund #	GovMax #	PROJECT TITLE	10	11	12	13	14	15	16	17	18	19	TOTAL
<b>Sanitary Sewer Collection Systems</b>													
4003	4201109	SAN Annual Pipe Rehab & Replacement Program	2,500,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	0	0	0	0	12,500,000
4003	4201110	SAN Annual Pipe Repair Lining Program		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	0	0	0	0	5,000,000
4003	4201111	SAN Annual Manhole Rehab Program		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	0	0	0	0	5,000,000
4003	4201187	SAN Force Main Replacements		250,000	250,000	250,000	250,000	250,000	0	0	0	0	1,250,000
4003	4201189	SAN Cleanout Installation Replacements		100,000	100,000	150,000	150,000	150,000	0	0	0	0	650,000
4003	4201190	SAN City Lateral Replacements		100,000	100,000	150,000	150,000	150,000	0	0	0	0	650,000
4003	4201223	SAN Pasadena Forcemain PCCP Replacement		0	1,000,000	1,000,000	0	0	0	0	0	0	2,000,000
4003	4201224	SAN Campbell Park Line Replacement	400,000	0	500,000	0	0	0	0	0	0	0	900,000
4003	4201121	SAN LS 63 & Force Main Upgrades		200,000	0	0	2,000,000	0	0	0	0	0	2,200,000
4003	new	SAN Aqueous Crossings Repair & Replacement		200,000	200,000	200,000	200,000	200,000	0				1,000,000
4003	n/a	SAN Aqueous Bridge Crossing 4 S/S over Booker Creek		0	0	0	0	0					0
4003	n/a	SAN Aqueous Bridge Crossing 4 S/S over Salt Creek		0	0	0	0	0					0
4003	4201313	SAN Gravity Line (6") Replacements		0	0	500,000	500,000	500,000	0	0	0	0	1,500,000
4003	n/a	Annexations		0	0	0	0	0	0	0	0	0	0
<b>Sanitary Sewer Collection Systems Grand Total</b>			<b>2,900,000</b>	<b>4,850,000</b>	<b>6,150,000</b>	<b>6,250,000</b>	<b>7,250,000</b>	<b>5,250,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>32,650,000</b>
<b>Tech Support</b>													
4003	4201114	PC Valve & MH Replacement	0	50,000	50,000	50,000	50,000	50,000	0	0	0	0	250,000
4003	42009035	FDOT US19/Whitney Road	0	420,000	0	4,020,000	0	0	0	0	0	0	4,440,000
4003	4201091	PC Belcher Rd 38 Avenue & 54 A/N	10,000	0	0	0	0	0	50,000	0	0	0	60,000
4003	4201193	PC 62nd A/N 49th St to 34th St	0	0	0	0	0	0	50,000	0	0	0	50,000
4003	42009036	Pasadena Water Main Improvements	0	0	0	0	250,000	0	0	0	0	0	250,000
4003	42009037	Bay Pines Water Main Improvements	0	0	0	0	0	0	380,000	0	0	0	380,000
4003	42009038	Pinellas Bayway Bridge Utility Relocation	0	140,000	0	0	0	0	0	0	0	0	140,000
4003	12212	PC La Plaza Avenue Bridge	0	0	0	0	0	0	0	0	0	0	0
4003	10332	PC Park Street ( Starkey Rd )	0	0	0	0	0	0	0	0	0	0	0
4003	n/a	PC Haines Road	0	0	0	0	0	0	800,000	0	0	0	800,000
4003	4201167	FDOT Gandy Blvd Overpass ( 16th St to 4th St)	0	140,000	0	0	0	0	1,500,000	0	0	0	1,640,000
4003	4201168	FDOT Gandy Blvd Milling & Resurfacing	0	400,000	0	0	0	0	0	0	0	0	400,000
4003	n/a	PC 22nd Avenue South	0	0	0	0	0	0	50,000	0	0	0	50,000
4003	4201267	PC Tiera Verde Bridge FM Relocation (2013)	0	0	1,500,000	0	0	0	0	0	0	0	1,500,000
			<b>10,000</b>	<b>1,150,000</b>	<b>1,550,000</b>	<b>4,070,000</b>	<b>300,000</b>	<b>50,000</b>	<b>2,830,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,960,000</b>
<b>Water Maintenance</b>													
4003	4201169	Bridge Crossing over Booker Creek	0	50,000	0	0	0	0	0	0	0	0	50,000
4003	4201192	Bridge Crossing over Salt Creek	0	20,000	50,000	0	0	0	0	0	0	0	70,000
4003	4201315	Bridge Crossing Overlook Dr NE east	0	0	0	10,000	30,000	0	0	0	0	0	40,000
			<b>0</b>	<b>70,000</b>	<b>50,000</b>	<b>10,000</b>	<b>30,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>160,000</b>
<b>Reclaimed Water</b>													
4003	4201355	Bridge Crossing Overlook Drive NE	0	0	0	10,000	20,000	0	0	0	0	0	30,000
			<b>0</b>	<b>0</b>	<b>0</b>	<b>10,000</b>	<b>20,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30,000</b>
<b>Sanitary Sewer</b>													
4003	4201092	Bridge Crossing over Booker Creek	0	300,000	0	0	0	0	0	0	0	0	300,000
4003	4201191	Bridge Crossing over Salt Creek	0	50,000	400,000	0	0	0	0	0	0	0	400,000
			<b>0</b>	<b>350,000</b>	<b>400,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>700,000</b>

FORM CR - 1  
 CAPITAL IMPROVEMENT PROGRAM PLAN  
 PROJECT RANKING  
 FY 2011-2015

PUBLIC WORKS  
 WATER RESOURCES

Contact:  
 Phone:

CIP Fund #	GovMax #	PROJECT TITLE	10	11	12	13	14	15	16	17	18	19	TOTAL
	4201116	<b>WRFNW</b> Chlorine Contact Basin		200,000	200,000								400,000
	4201170	<b>WRF AW</b> Reject Water Pipeline	0	500,000	0	0	0	0	0	0	0	0	500,000
			0	700,000	200,000	0	0	0	0	0	0	0	900,000
		<b>Tech Support Total</b>	10,000	2,270,000	2,200,000	4,090,000	350,000	50,000	2,830,000	0	0	0	11,750,000
4003	4201113	<b>Laboratory</b> Laboratory Improvements	0	170,000	0	0	50,000	50,000	0	0	0	0	270,000
		<b>Laboratory Grand Total</b>	0	170,000	0	0	50,000	50,000	0	0	0	0	270,000
4003	4201112	<b>IT- WAM, LIMS, SCADA</b> Computerized Enhancements	0	100,000	100,000	100,000	100,000		0	0	0	0	400,000
	4201171	Asset Condition Assessment Phase I		100,000									100,000
	4201363	Asset Condition Assessment Phase II				100,000							100,000
		<b>IT Grand Total</b>	0	200,000	100,000	200,000	100,000	0	0	0	0	0	600,000
<b>DEPARTMENT GRAND TOTAL</b>			6,400,000	27,850,000	27,885,000	29,644,000	20,504,000	25,891,000	12,640,000	5,260,000	1,200,000	0	157,224,000

Reject Pump Station Electrical			
Electrical - Use average of LS #28 +LS#63 for Alternative #1 [( 1,565.99 + 1466.49)/2]MG		\$1,516.24	avg \$/month/MG
		\$50.54	avg \$/day/MG
Assume 2 days per month of reject event		\$101.08	
At 7 MG of reject		\$707.58	avg \$/month
For 12 months		\$8,490.94	avg \$/yr

Pump Station O&M			
Electrical - Use average of LS #28 +LS#63 for Alternative #1 [( 1,565.99 + 1466.49)/2]MG		\$1,516.24	avg \$/month/MG
Electrical - Use LS #28 for Alternative #3 at \$1,565.99/MG		\$1,565.99	avg \$/month/MG
Electrical for Pasadena PS additional flow - \$565.52 per MG		\$565.52	avg \$/month/MG

Per Evelyn Rosetti, The lease charges are as below:		% Increase		
2009- \$178,862	\$178,862			
2010 -\$184,224	\$184,224	2.9		
2011- \$189,700	\$189,700	2.9		
You can calculate the future yearly increase factor from these numbers.			Use 3% Increase Rate	

<b>NWRWF</b>	FY2009	AADF (2009) in MGD	FY 2009 Average Annual Cost/MGD	FY 2010 Average Annual Cost/MGD
Electrical	\$ 701,169	10.01	\$ 70,047	\$ 72,148
Chemical	\$ 366,224	10.01	\$ 36,586	\$ 37,683
Sludge Processing	\$ 303,245	10.01	\$ 30,294	\$ 31,203
<b>SWRWF</b>	FY2009	AADF (2009) in MGD	FY 2009 Average Annual Cost/MGD	FY 2010 Average Annual Cost/MGD
Electrical	\$ 727,953	9.77	\$ 74,509	\$ 76,744
Chemical	\$ 350,608	9.77	\$ 35,886	\$ 36,963
Sludge Processing	\$ 273,676	9.77	\$ 28,012	\$ 28,852
<b>AWWRF</b>	FY2009	AADF (2009) in MGD	FY 2009 Average Annual Cost/MGD	FY 2010 Average Annual Cost/MGD
Electrical	\$ 506,150	5.94	\$ 85,210	\$ 87,767
Chemical	\$ 223,997	5.94	\$ 37,710	\$ 38,841
Sludge Processing	\$ 181,621	5.94	\$ 30,576	\$ 31,493

# ELECTRIC BILLING HISTORY



<b>Customer Name:</b> CITY OF ST PETERSBURG	Lift Station #28 - Big Lake Maggorrie
<b>Location:</b> 4015 ML KING ST S *LIFT ST PETERSBURG FL 33705	4 submersible pumps rated at 2,486 gpm at 178 feet head
<b>Account Number:</b> 79497-92140	185hp motors (555 total hp for three pumps)
<b>Service Base Description:</b> Metered Service	
<b>Service Base:</b> 66244885	

### Confidential and Proprietary Information

Billing Period (Current 12 Months)	kWh Consumption			kW Demand			L F	kVAr	Metered Svc Charges *		Total Bill Amt		Average \$	
	Read Date	Days	Rate	Total	On-Peak	Daily			Base	On-Peak	Monthly	per kWh	Amt	per kWh
05/21/10	28	53	24,760	6,760	884	72	51%		\$2,400.39	9.69¢	\$2,613.77	10.56¢	1.32	\$1,980.13
04/23/10	30	53	30,000	7,960	1,000	74	56%		\$2,825.29	9.42¢	\$3,076.43	10.25¢	1.80	\$1,709.13
03/24/10	30	53	26,960	6,880	899	68	55%		\$2,511.30	9.31¢	\$2,734.53	10.14¢	1.43	\$1,912.26
02/22/10	31	53	31,520	7,440	1,017	67	63%		\$2,865.00	9.07¢	\$3,119.67	9.90¢	1.89	\$1,650.62
01/22/10	27	53	30,960	7,360	1,147	80	60%		\$2,809.39	9.07¢	\$3,137.64	10.13¢	2.30	\$1,364.19
12/26/09	36	53	42,240	9,520	1,173	140	35%		\$3,880.29	9.19¢	\$4,320.71	10.23¢	2.58	\$1,674.69
11/20/09	30	53	31,520	8,600	1,051	78	56%		\$3,029.46	9.61¢	\$3,379.64	10.72¢	2.26	\$1,495.42
10/21/09	28	53	33,520	8,920	1,197	106	47%		\$3,291.50	9.82¢	\$3,677.62	10.97¢	2.87	\$1,281.40
09/23/09	33	53	49,400	12,040	1,497	153	41%		\$4,733.34	9.58¢	\$5,282.84	10.69¢	3.57	\$1,479.79
08/21/09	28	53	32,120	8,680	1,147	68	70%		\$3,034.05	9.45¢	\$3,379.86	10.52¢	2.52	\$1,341.21
07/24/09	29	53	40,120	10,520	1,383	101	57%		\$3,831.72	9.55¢	\$4,273.03	10.65¢	3.27	\$1,306.74
06/25/09	34	53	37,760	9,600	1,111	72	64%		\$3,504.46	9.28¢	\$3,815.08	10.10¢	2.39	\$1,596.27
<b>Total</b>	<b>364</b>		<b>410,880</b>						<b>\$38,716.19</b>		<b>\$42,810.82</b>			<b>Average Cost</b>
<b>Maximum</b>	<b>36</b>		<b>49,400</b>	<b>12,040</b>	<b>1,497</b>	<b>153</b>	<b>70%</b>		<b>\$4,733.34</b>	<b>9.82¢</b>	<b>\$5,282.84</b>	<b>10.97¢</b>		<b>per MG</b>
<b>Average</b>	<b>30.3</b>		<b>34,240</b>	<b>8,690</b>	<b>1,125</b>	<b>90</b>	<b>52.3%</b>		<b>\$3,226.35</b>	<b>9.42¢</b>	<b>\$3,567.57</b>	<b>10.41¢</b>		
<b>Minimum</b>	<b>27</b>		<b>24,760</b>	<b>6,760</b>	<b>884</b>	<b>67</b>	<b>35%</b>		<b>\$2,400.39</b>	<b>9.07¢</b>	<b>\$2,613.77</b>	<b>9.90¢</b>		

Current 12 months

Billing Period (Previous 12 Months)	kWh Consumption			kW Demand			L F	kVAr	Metered Svc Charges		Total Bill Amt	
	Read Date	Days	Rate	Total	On-Peak	Daily			Base	On-Peak	Monthly	per kWh
05/22/09	29	53	29,640	8,040	1,022	82	52%		\$2,878.72	9.71¢	\$3,133.87	10.57¢
04/23/09	29	53	27,960	7,280	964	68	54%		\$2,670.13	9.55¢	\$2,906.79	10.40¢
03/25/09	27	53	26,240	6,560	972	74	55%		\$2,824.28	10.76¢	\$3,074.62	11.72¢
02/26/09	30	53	29,680	7,760	989	90	46%		\$3,215.87	10.84¢	\$3,500.91	11.80¢
01/27/09	35	53	33,480	7,760	957	108	37%		\$3,592.28	10.73¢	\$3,910.69	11.68¢
12/23/08	32	53	30,000	7,000	938	69	57%		\$2,467.80	8.23¢	\$2,686.54	8.96¢
11/21/08	29	53	27,320	7,440	942	68	58%		\$2,330.13	8.53¢	\$2,536.67	9.29¢
10/23/08	29	53	28,640	7,880	988	84	49%		\$2,468.38	8.62¢	\$2,687.17	9.38¢
09/24/08	30	53	29,200	7,840	973	70	58%		\$2,464.61	8.44¢	\$2,682.99	9.19¢
08/25/08	34	53	38,560	10,440	1,134	100	47%		\$3,292.82	8.54¢	\$3,584.58	9.30¢
07/22/08	29	53	36,160	9,480	1,247	106	49%		\$2,920.23	8.08¢	\$3,178.98	8.79¢
06/23/08	31	70	34,320		1,107	122	38%		\$3,071.91	8.95¢	\$3,344.10	9.74¢
<b>Total</b>	<b>364</b>		<b>371,200</b>						<b>\$34,197.16</b>		<b>\$37,227.91</b>	
<b>Maximum</b>	<b>35</b>		<b>38,560</b>	<b>10,440</b>	<b>1,247</b>	<b>122</b>	<b>58%</b>		<b>\$3,592.82</b>	<b>10.84¢</b>	<b>\$3,910.69</b>	<b>11.80¢</b>
<b>Average</b>	<b>30.3</b>		<b>30,933</b>	<b>7,953</b>	<b>1,019</b>	<b>87</b>	<b>48.7%</b>		<b>\$2,849.76</b>	<b>9.21¢</b>	<b>\$3,102.33</b>	<b>10.07¢</b>
<b>Minimum</b>	<b>27</b>		<b>26,240</b>	<b>6,560</b>	<b>938</b>	<b>67</b>	<b>37%</b>		<b>\$2,330.13</b>	<b>8.08¢</b>	<b>\$2,536.67</b>	<b>8.79¢</b>

Previous 12 Months



# ELECTRIC BILLING HISTORY

<b>Customer Name:</b> CITY OF ST PETERSBURG		<b>Lift Station #61 - Pasadena</b>	
<b>Location:</b> 6800 TRAVELERS WAY S, 42 ST PETERSBURG FL 33707		<b>4 Vertical Centrifugal Pumps rated at 5,520 gpm at 75.2 feet of head - 150 hp motors</b>	
<b>Account Number:</b> 56781-67733	<b>Service Base:</b> 8030721		
<b>Service Base Description:</b> Metered Service			

Note: \* Cost does not include sales tax or other charges.

Confidential and Proprietary Information															
Billing Period (Current 12 Months)		kWh Consumption			kW Demand			Metered Svc Charges *		Total Bill Amt					
Read Date	Days	Rate	Total	On-Peak	Daily	Base	On-Peak	L F	kVAr	Monthly	per kWh	Amt	per kWh	Average Flow	Average \$
										MG				MG	MG
07/19/10	32	53	2,820	780	88	10	10	37%		\$299.62	10.62¢	\$326.25	11.57¢		
06/17/10	30	53	4,020	1,140	134	38	36	15%		\$529.97	13.18¢	\$877.08	14.36¢		
05/18/10	29	53	19,020	5,400	656	53	46	52%		\$1,829.43	9.62¢	\$1,992.05	10.47¢	3.96	\$503.04
04/19/10	32	53	32,820	8,280	1,026	100	91	43%		\$3,126.72	9.53¢	\$3,404.66	10.37¢	5.55	\$613.45
03/18/10	29	53	25,500	6,420	879	69	64	53%		\$2,391.45	9.38¢	\$2,604.03	10.21¢	5.09	\$511.60
02/17/10	29	53	24,660	6,180	850	82	53	43%		\$2,299.82	9.33¢	\$2,504.26	10.16¢	4.90	\$581.94
01/19/10	33	53	27,660	5,940	838	79	56	44%		\$2,436.68	8.81¢	\$2,717.64	9.83¢	4.67	\$563.57
12/17/09	30	53	26,940	6,540	898	61	53	61%		\$2,499.77	9.28¢	\$2,784.05	10.33¢	4.94	\$612.36
11/17/09	32	53	28,440	7,560	889	67	64	55%		\$2,702.35	9.50¢	\$3,012.83	10.59¢	4.92	\$616.32
10/16/09	25	53	24,060	7,140	962	64	64	63%		\$2,367.85	9.84¢	\$2,643.56	10.99¢	5.12	\$638.87
09/21/09	33	53	33,420	8,640	1,013	98	75	43%		\$3,174.68	9.50¢	\$3,539.33	10.59¢	5.54	\$600.92
08/19/09	30	53	28,140	8,640	938	74	71	53%		\$2,772.58	9.85¢	\$3,094.72	11.00¢		
<b>Total</b>	<b>364</b>		<b>277,500</b>							<b>\$26,430.92</b>		<b>\$29,200.46</b>			
<b>Maximum</b>	<b>33</b>		<b>33,420</b>	<b>8,640</b>	<b>1,026</b>	<b>100</b>	<b>91</b>	<b>63%</b>		<b>\$3,174.68</b>	<b>13.18¢</b>	<b>\$3,539.33</b>	<b>14.36¢</b>		
<b>Average</b>	<b>30.3</b>		<b>23,125</b>	<b>6,055</b>	<b>764</b>	<b>66</b>	<b>57</b>	<b>47.9%</b>		<b>\$2,202.58</b>	<b>9.52¢</b>	<b>\$2,433.37</b>	<b>10.87¢</b>		
<b>Minimum</b>	<b>25</b>		<b>2,820</b>	<b>780</b>	<b>88</b>	<b>10</b>	<b>10</b>	<b>15%</b>		<b>\$299.62</b>	<b>8.81¢</b>	<b>\$326.25</b>	<b>9.83¢</b>		

Confidential and Proprietary Information															
Billing Period (Previous 12 Months)		kWh Consumption			kW Demand			Metered Svc Charges		Total Bill Amt		Average \$			
Read Date	Days	Rate	Total	On-Peak	Daily	Base	On-Peak	L F	kVAr	Monthly	per kWh	Amt	per kWh	Average Flow	Average \$
										MG				MG	MG
07/20/09	32	53	34,200	9,180	1,069	77	77	58%		\$3,248.39	9.50¢	\$3,620.33	10.59¢	6.24	\$580.18
06/18/09	30	53	28,320	7,980	944	68	61	58%		\$2,712.06	9.58¢	\$2,952.45	10.43¢	5.34	\$552.89
05/19/09	28	53	22,980	6,780	821	62	62	55%		\$2,263.17	9.85¢	\$2,463.77	10.72¢		\$565.52
04/21/09	33	53	33,000	8,820	1,000	78	66	53%		\$3,113.18	9.43¢	\$3,389.12	10.27¢		
03/19/09	27	53	24,540	6,120	909	68	62	56%		\$2,635.92	10.74¢	\$2,869.56	11.69¢		
02/20/09	30	53	26,040	6,720	868	67	62	54%		\$2,796.20	10.74¢	\$3,044.05	11.69¢		
01/21/09	33	53	28,320	6,240	858	60	56	60%		\$2,923.47	10.32¢	\$3,182.59	11.24¢		
12/19/08	30	53	25,080	6,120	836	54	54	65%		\$2,068.09	8.25¢	\$2,251.40	8.98¢		
11/19/08	33	53	31,140	8,160	944	72	59	55%		\$2,578.68	8.28¢	\$2,807.24	9.01¢		
10/17/08	29	53	29,940	8,580	1,032	88	88	49%		\$2,626.31	8.77¢	\$2,859.09	9.55¢		
09/18/08	33	53	34,020	8,880	1,031	78	71	55%		\$2,830.98	8.32¢	\$3,081.82	9.06¢		
08/16/08	30	53	33,060	10,020	1,102	78	68	59%		\$2,832.12	8.57¢	\$3,083.06	9.33¢		
<b>Total</b>	<b>368</b>		<b>350,640</b>							<b>\$32,628.57</b>		<b>\$35,604.48</b>			
<b>Maximum</b>	<b>33</b>		<b>34,200</b>	<b>10,020</b>	<b>1,102</b>	<b>88</b>	<b>88</b>	<b>65%</b>		<b>\$3,248.39</b>	<b>10.74¢</b>	<b>\$3,620.33</b>	<b>11.69¢</b>		
<b>Average</b>	<b>30.7</b>		<b>29,220</b>	<b>7,800</b>	<b>951</b>	<b>71</b>	<b>66</b>	<b>56.0%</b>		<b>\$2,719.05</b>	<b>9.31¢</b>	<b>\$2,967.04</b>	<b>10.21¢</b>		
<b>Minimum</b>	<b>27</b>		<b>22,980</b>	<b>6,120</b>	<b>821</b>	<b>54</b>	<b>54</b>	<b>49%</b>		<b>\$2,068.09</b>	<b>8.25¢</b>	<b>\$2,251.40</b>	<b>8.98¢</b>		

# ELECTRIC BILLING HISTORY



<b>Customer Name:</b> CITY OF ST PETERSBURG	<b>Lift Station #63 - NE Master</b>
<b>Location:</b> 9600 SAN MARTIN BLVD NE *LIFT 63 ST PETERSBURG FL 33702	3 submersible pumps rated at 3,900 gpm at 106 feet head
<b>Account Number:</b> 12748-39245	<b>Service Base:</b> 86350833
<b>Service Base Description:</b> Metered Service	

Note: \* Cost does not include sales tax or other charges.

### Confidential and Proprietary Information

Billing Period (Current 12 Months)		kWh Consumption			kW Demand		kVAr	Metered Svc Charges *		Total Bill Amt		Average \$	Average \$
Read Date	Days	Rate	On-Peak	Daily	Base	On-Peak	L F	Monthly	per kWh	Amt	per kWh	MG	hp (Assuming 300)
06/03/10	31	53	31,800	1,026	80	53%		\$3,064.62	9.64¢	\$3,143.20	9.88¢	1.95	\$1,611.90
05/03/10	27	53	26,880	7,680	76	55%		\$2,558.62	9.52¢	\$2,624.23	9.76¢	1.98	\$1,325.37
04/06/10	33	53	33,120	8,400	80	52%		\$3,065.84	9.26¢	\$3,144.45	9.49¢	1.94	\$1,620.85
03/04/10	29	53	29,460	7,620	66	64%		\$2,735.51	9.29¢	\$2,805.65	9.52¢	1.97	\$1,424.19
02/03/10	27	53	25,620	6,540	56	71%		\$2,315.39	9.04¢	\$2,433.53	9.50¢	1.91	\$1,274.10
01/07/10	35	53	33,240	7,920	74	53%		\$2,964.18	8.92¢	\$3,114.17	9.37¢	1.92	\$1,621.96
12/03/09	33	53	31,920	5,820	215	19%		\$2,955.54	9.26¢	\$3,106.03	9.73¢	1.87	\$1,660.98
10/31/09	29	53	27,420	946				\$1,934.90	7.06¢	\$2,002.33	7.30¢	2.02	\$991.25
10/02/09	30	53	31,320	8,160	151	29%		\$3,256.70	10.40¢	\$3,442.47	10.99¢	2.15	\$1,601.15
09/02/09	30	53	28,860	8,640	69	58%		\$2,812.86	9.75¢	\$2,956.34	10.24¢	2.02	\$1,463.53
08/03/09	28	53	25,860	7,740	55	70%		\$2,497.09	9.66¢	\$2,622.66	10.14¢	2.02	\$1,298.35
07/06/09	33	53	31,680	8,760	98	41%		\$3,049.23	9.63¢	\$3,204.07	10.11¢	1.88	\$1,704.29
<b>Total</b>	<b>365</b>		<b>357,180</b>					<b>\$33,210.48</b>					<b>\$1,466.49</b>
<b>Maximum</b>	<b>35</b>		<b>33,240</b>	<b>1,044</b>	<b>215</b>	<b>71%</b>		<b>\$3,256.70</b>	<b>10.40¢</b>	<b>\$3,442.47</b>	<b>10.99¢</b>		<b>Average Cost</b>
<b>Average</b>	<b>30.4</b>		<b>29,765</b>	<b>7,882</b>	<b>93</b>	<b>44.0%</b>		<b>\$2,767.54</b>	<b>9.30¢</b>	<b>\$2,883.26</b>	<b>9.67¢</b>		<b>per MG</b>
<b>Minimum</b>	<b>27</b>		<b>25,620</b>	<b>5,820</b>	<b>55</b>	<b>19%</b>		<b>\$1,934.90</b>	<b>7.06¢</b>	<b>\$2,002.33</b>	<b>7.30¢</b>		

Current 12 months

Billing Period (Previous 12 Months)		kWh Consumption			kW Demand		kVAr	Metered Svc Charges		Total Bill Amt	
Read Date	Days	Rate	On-Peak	Daily	Base	On-Peak	L F	Monthly	per kWh	Amt	per kWh
06/03/09	29	53	25,980	7,380	67	67%		\$2,527.69	9.73¢	\$2,592.50	9.98¢
05/05/09	33	53	30,120	8,640	67	57%		\$2,893.63	9.61¢	\$2,967.83	9.85¢
04/02/09	28	53	27,600	6,960	65	63%		\$2,599.88	9.42¢	\$2,666.54	9.66¢
03/05/09	28	53	26,880	6,900	111	36%		\$3,051.14	11.35¢	\$3,129.37	11.64¢
02/05/09	30	53	28,020	7,320	56	69%		\$2,961.07	10.57¢	\$3,036.99	10.84¢
01/06/09	33	53	30,600	7,020	58	67%		\$3,160.45	10.33¢	\$3,241.49	10.59¢
12/04/08	30	53	28,560	7,200	66	60%		\$2,382.66	8.34¢	\$2,443.75	8.56¢
11/04/08	32	53	31,800	9,060	65	64%		\$2,675.29	8.41¢	\$2,743.89	8.63¢
10/03/08	29	53	30,960	9,000	87	51%		\$2,650.02	8.56¢	\$2,717.97	8.78¢
09/04/08	31	53	33,360	9,960	109	42%		\$2,918.75	8.59¢	\$2,993.59	8.82¢
08/04/08	34	53	37,800	10,320	154	30%		\$3,347.61	8.86¢	\$3,433.45	9.08¢
07/01/08	29	53	29,820	8,820	62	69%		\$2,443.78	8.20¢	\$2,506.44	8.41¢
<b>Total</b>	<b>366</b>		<b>362,100</b>					<b>\$35,611.97</b>		<b>\$34,473.81</b>	
<b>Maximum</b>	<b>34</b>		<b>37,800</b>	<b>10,320</b>	<b>154</b>	<b>69%</b>		<b>\$3,347.61</b>	<b>11.35¢</b>	<b>\$3,433.45</b>	<b>11.64¢</b>
<b>Average</b>	<b>30.5</b>		<b>30,175</b>	<b>8,215</b>	<b>81</b>	<b>51.2%</b>		<b>\$2,801.00</b>	<b>9.28¢</b>	<b>\$2,872.82</b>	<b>9.57¢</b>
<b>Minimum</b>	<b>28</b>		<b>25,980</b>	<b>6,900</b>	<b>56</b>	<b>30%</b>		<b>\$2,382.66</b>	<b>8.20¢</b>	<b>\$2,443.75</b>	<b>8.41¢</b>

Previous 12 Months

## **New Pump Station Costs**

### **Odor Control**

Annual Service Contract	\$1,600
Chemical Costs (\$500/month)	\$6,000
Electrical for Blowers (\$600/month)	\$7,200

### **General Pump Station O&M**

Lawn Care (\$100/month)	\$1,200
AC Manintenance (\$260/month)	\$3,120
Generator (annual service contract)	\$2,500
Overhead Crane (\$400/yr)	400

### **Pump Maintenance**

Personnel (crew of 2 people, 10 hrs/wk at \$50/hr)	\$52,000
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**Total Annual Costs** **\$74,020** apply to new pump stations Alt #1 and #3

Pump Rebuild (1/2 of time between replacement - every 8th year)  
\$10,000 per pump  
Add to R&R costs at each pump station

Information provided by David Cindric 8/17/10

### **Reject Pump Station Incremental Costs**

For reject pump station include; 1/2 of personnel pump maintenance \$  
\$26,000

## **Appendix B**

### **CDM Constructors Inc. Cost Estimates - Summary**

**City of St Petersburg, FL  
AWWRF Alternate 1  
Opinion of Probable Construction Cost, September 2010, Concept**

<b>Project name</b>	AWWRF Alternate 1
<b>Estimator</b>	DRC/MB
<b>Labor rate table</b>	FL10 Labor FL
<b>Equipment rate table</b>	00 10 Equip Rate
<b>Project Estimate Type</b>	Project Type OPC - GMP - ETC
<b>Design Level</b>	XX %
<b>General Conditions</b>	X %
<b>OH and P</b>	X %
<b>Contingency</b>	XX %
<b>Escalation</b>	X %
<b>Owners Budget</b>	\$
<b>Budget Source</b>	\$
<b>Estimator</b>	Initials
<b>ENR 20 City CCI:</b>	July 2010: 8864.72
<b>Notes</b>	<p>This is an Opinion of Probable Construction Cost only, as defined by the documents provided at the level of design indicated above. CDM has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding (at least 3 each - both prime bidders and major subcontractors), market conditions or negotiating terms. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.</p> <p>There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.</p> <p>Assumptions: No rock excavation is required. Only nominal dewatering is needed. No consideration for contaminated soils or hazardous materials is included (i.e. asbestos, lead, etc). Based on a normal 40 hour work week with no overtime.</p>
<b>Report format</b>	Sorted by 'Area/95CSI Sctrn/Element' 'Detail' summary Allocate addons Combine items

Spreadsheet Level	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
<b>05 Influent Diversion Pump Station</b>								
<b>02240 Dewatering for Diversion Pump Station</b>								
05.02240.1310 Bypass Pumping for 6 MGD	30.00 dy	11,613	40,340	1,622	35,818		2,979.76 /dy	89,393
05.02240.1400 Dewatering Sump Pump 1000 GPH	60.00 day	246	711		484		24.00 /day	1,440
<b>02240 Dewatering for Diversion Pump Station</b>		<b>11,859</b>	<b>41,051</b>	<b>1,622</b>	<b>36,301</b>			<b>90,833</b>
<b>02250 Sheet Piling and Shoring</b>								
05.02250.1400 Sheet Piling 40 Feet Pull and Salvage	6,000.00 sf			316,279			52.71 /sf	316,279
<b>02250 Sheet Piling and Shoring</b>				<b>316,279</b>				<b>316,279</b>
<b>02300 Earthwork</b>								
05.02300.1310 Excavate for Pump Station	2,196.00 cy	5,414	2,058	882	11,090		8.86 /cy	19,445
<b>02300 Earthwork</b>		<b>5,414</b>	<b>2,058</b>	<b>882</b>	<b>11,090</b>			<b>19,445</b>
<b>02800 Site Improvements</b>								
05.02800.1310 Fence & Gate	300.00 lf			30,979			103.26 /lf	30,979
<b>02800 Site Improvements</b>				<b>30,979</b>				<b>30,979</b>
<b>03300 Cast-in-Place Concrete</b>								
05.03300.1310 Pump Station Slab	104.00 cy	15,146	37,541	2,107	175	384	532.24 /cy	55,353
05.03300.1320 Pump Station Walls	208.00 cy	79,068	138,785	26,807	1,169	769	1,185.57 /cy	246,598
05.03300.1330 Pump Station Top Slab	117.00 cy	27,713	42,609	21,761	2,462	430	811.76 /cy	94,976
<b>03300 Cast-in-Place Concrete</b>		<b>121,928</b>	<b>218,935</b>	<b>50,675</b>	<b>3,806</b>	<b>1,583</b>		<b>396,926</b>
<b>05500 Metal Fabrications</b>								
05.05500.1310 Pump Station Hatches	3.00 ea	553	9,223				3,258.64 /ea	9,776
05.05500.1320 Stairs and Railings	43.00 trd	30,212	56,046		12,101		2,287.39 /trd	98,358
<b>05500 Metal Fabrications</b>		<b>30,764</b>	<b>65,269</b>		<b>12,101</b>			<b>108,134</b>
<b>11200 Water Treatment Equipment</b>								
05.11200.1320 Pump Alternative #1	3.00 ea	4,116	496,586		3,222	1,436	168,453.34 /ea	505,360
<b>11200 Water Treatment Equipment</b>		<b>4,116</b>	<b>496,586</b>		<b>3,222</b>	<b>1,436</b>		<b>505,360</b>
<b>13000 Special Construction</b>								
05.13000.1310 Electrical Enclosure	1.00 ea			32,625			32,625.22 /ea	32,625
<b>13000 Special Construction</b>				<b>32,625</b>				<b>32,625</b>
<b>13400 Measurement &amp; Control Instrumentation</b>								
05.13400.1310 PLC & Scada System	1.00 ls	2,477	110,679	10,543		141,423	265,121.66 /ls	265,122
05.13400.1320 I&C Devices	13.00 ea	2,250	21,757			2,081	2,006.83 /ea	26,089
05.13400.1330 I&C Conduit & Wire	1,000.00 lf	12,112	6,602				18.71 /lf	18,714
<b>13400 Measurement &amp; Control Instrumentation</b>		<b>16,839</b>	<b>139,038</b>	<b>10,543</b>		<b>143,504</b>		<b>309,924</b>
<b>15000 Process Mechanical</b>								
05.15000.1310 40 lf of 60" DIP for Connection to Existing	40.00 lf	4,064	44,494	227	1,998		1,269.57 /lf	50,783
05.15000.1320 20" BFV for Pumps	7.00 ea	6,061	32,010			18	5,441.29 /ea	38,089
05.15000.1330 20" CV for Pumps	5.00 ea	2,548	58,244			8	12,160.08 /ea	60,800
<b>15000 Process Mechanical</b>		<b>12,674</b>	<b>134,748</b>	<b>227</b>	<b>1,998</b>	<b>25</b>		<b>149,672</b>
<b>16090 Service &amp; Distribution</b>								
05.16090.1310 VFD - Option NO. 1	3.00 ea	8,193	332,873				113,688.67 /ea	341,066
05.16090.1340 SWGR - Option NO. 1	1.00 ea	8,675	266,890		442		276,007.30 /ea	276,007
05.16090.1350 25 KVA Transformer	1.00 ea	1,827	13,135				14,961.63 /ea	14,962
05.16090.1400 650 KW Generator	1.00 ea	4,331	429,491		1,501	11,352	446,674.41 /ea	446,674
<b>16090 Service &amp; Distribution</b>		<b>23,026</b>	<b>1,042,389</b>		<b>1,943</b>	<b>11,352</b>		<b>1,078,709</b>
<b>16120 Building Lighting</b>								
05.16120.1310 Building Lighting	102.63 sf	4,553	5,678				99.69 /sf	10,231
<b>16120 Building Lighting</b>		<b>4,553</b>	<b>5,678</b>					<b>10,231</b>
<b>16130 Feeders</b>								
05.16130.1310 Power Authority Transformer to ATS Electrical Bldg	150.00 lf	42,407	196,917		137		1,596.41 /lf	239,461
05.16130.1320 SWGR to ATS	20.00 lf	11,526	55,233				3,337.97 /lf	66,759
05.16130.1330 ATS to Generator	50.00 lf	24,864	103,163		46		2,561.47 /lf	128,074
05.16130.1340 ATS to Generator (Control Wires)	50.00 lf	1,080	480				31.20 /lf	1,560
05.16130.1350 LP Panel to Generator Panel	50.00 lf	619	277				17.92 /lf	896
05.16130.1360 SWGR to Pumps(3ea) Option No. 1	300.00 lf	34,190	76,197		31		368.06 /lf	110,417
<b>16130 Feeders</b>		<b>114,687</b>	<b>432,266</b>		<b>214</b>			<b>547,167</b>
<b>05 Influent Diversion Pump Station</b>		<b>345,859</b>	<b>2,578,019</b>	<b>443,832</b>	<b>70,674</b>	<b>157,900</b>		<b>3,596,285</b>
<b>06 Influent Channel in Wet Well</b>								
<b>03300 Cast-in-Place Concrete</b>								
06.03300.1400 Influent Channel Concrete Work	80.00 cy			88,883			1,111.03 /cy	88,883
<b>03300 Cast-in-Place Concrete</b>				<b>88,883</b>				<b>88,883</b>
<b>15000 Process Mechanical</b>								

Spreadsheet Level	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
06.15000.1400 Water Treatment Equipment	1.00 lot	3,007	223,337		1,678		228,021.38 /lot	228,021
06.15000.1401 Misc Piping Gates Screens	1.00 lot	26,664	546,498				573,161.92 /lot	573,162
15000 Process Mechanical		29,670	769,835		1,678			801,183
16000 Electrical Allowances/Miscellaneous								
06.16000.1400 Electrical and Instrumentation Grinder Pump	1.00 ls	18,219	48,718				66,937.02 /ls	66,937
16000 Electrical Allowances/Miscellaneous		18,219	48,718					66,937
<b>06 Influent Channel in Wet Well</b>		<b>47,890</b>	<b>818,553</b>	<b>88,883</b>	<b>1,678</b>			<b>957,003</b>
<b>07 Reward Well Connection</b>								
15000 Process Mechanical								
07.15000.1400 4 Inch PVC	450.00 lf	19,524	24,703	17,841	1,573		141.43 /lf	63,641
15000 Process Mechanical		19,524	24,703	17,841	1,573			63,641
<b>07 Reward Well Connection</b>		<b>19,524</b>	<b>24,703</b>	<b>17,841</b>	<b>1,573</b>			<b>63,641</b>
<b>15 Piping to Alternate WWTP - Alt No.1</b>								
02000 Sitework								
15.02000.1400 Asphalt Demolition and Disposal - Milling of Bituminous Surface Only	25,713.00 sy			98,841			3.84 /sy	98,841
02000 Sitework				98,841				98,841
02600 Drainage & Containment								
05.02600.1330 36" DIP Excavation, Backfill & Dewatering	33,050.00 lf	125,119	81,362	189,565	133,130		16.01 /lf	529,175
05.02600.1335 36" DIP Epoxy Lined & Fittings	33,050.00 lf	971,352	15,791,004				507.18 /lf	16,762,357
02600 Drainage & Containment		1,096,471	15,872,366	189,565	133,130			17,291,531
02700 Base/Ballast/Pavements & Appurtenances								
15.02700.1310 Replace Pavement - 36" DIP (25, 713 sy)8" Agg Base 2" Wearing Surface	25,713.00 sy			1,501,383			58.39 /sy	1,501,383
02700 Base/Ballast/Pavements & Appurtenances				1,501,383				1,501,383
13400 Measurement & Control Instrumentation								
15.13400.1310 36" Venturi Meter	1.00 ea	1,505	30,455				31,960.30 /ea	31,960
13400 Measurement & Control Instrumentation		1,505	30,455					31,960
<b>15 Piping to Alternate WWTP - Alt No.1</b>		<b>1,097,976</b>	<b>15,902,821</b>	<b>1,789,788</b>	<b>133,130</b>			<b>18,923,715</b>
<b>30 Gravity Flow Modifications</b>								
02600 Drainage & Containment								
30.02600.1400 RCP Pipe 60" 14 Ft Invert	1,000.00 lf	101,317	224,977		126,715		453.01 /lf	453,009
30.02600.1401 PVC Pipe 8 Inch	500.00 lf	6,907	6,365		16,352		59.25 /lf	29,623
30.02600.1402 Junction Boxes 14 Foot Depth	2.00 ea	9,596	37,196	98	12,112		29,500.79 /ea	59,002
30.02600.1403 Storm Manhole 14 Foot Depth	1.00 ea	4,508	18,155	26	5,611		28,299.98 /ea	28,300
02600 Drainage & Containment		122,329	286,692	123	160,790			569,934
<b>30 Gravity Flow Modifications</b>		<b>122,329</b>	<b>286,692</b>	<b>123</b>	<b>160,790</b>			<b>569,934</b>
<b>35 Odor Control Equipment</b>								
15960 Odor Control								
35.15960.1400 Odor Control Wet Scrubber System 21 MGD Peak Flow	1.00 ls	11,855	549,882		6,568		568,305.09 /ls	568,305
15960 Odor Control		11,855	549,882		6,568			568,305
16000 Electrical Allowances/Miscellaneous								
35.16000.1400 Electrical Allowance for Hookup	48.00 ch	3,297					68.69 /ch	3,297
16000 Electrical Allowances/Miscellaneous		3,297						3,297
<b>35 Odor Control Equipment</b>		<b>15,152</b>	<b>549,882</b>		<b>6,568</b>			<b>571,602</b>

**Estimate Totals**

Description	Amount	Totals	Hours	Rate
Labor	1,648,730		32,517 hrs	
Material	20,160,670			
Subcontract	2,340,468			
Equipment	374,413		7,256 hrs	
Other	157,900			
<b>Total Cost at:</b>	<b>24,682,181</b>	<b>24,682,181</b>		
Priced in 2010 Dollars		<b>24,682,181</b>		
<b>Total</b>		<b>24,682,181</b>		

**City of St Petersburg, FL  
AWWRF Alternate 3  
Opinion of Probable Construction Cost, September 2010, Concept**

<b>Project name</b>	AWWRF Alternate 3
<b>Estimator</b>	DRC/MB
<b>Labor rate table</b>	FL10 Labor FL
<b>Equipment rate table</b>	00 10 Equip Rate
<b>Project Estimate Type</b>	WWTP OPC
<b>Design Level</b>	XX %
<b>General Conditions</b>	X %
<b>OH and P</b>	X %
<b>Contingency</b>	XX %
<b>Escalation</b>	X %
<b>Owners Budget</b>	\$
<b>Budget Source</b>	\$
<b>Estimator</b>	DRC
<b>ENR 20 City CCI:</b>	July 2010: 8864.72
<b>Notes</b>	<p>This is an Opinion of Probable Construction Cost only, as defined by the documents provided at the level of design indicated above. CDM has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding (at least 3 each - both prime bidders and major subcontractors), market conditions or negotiating terms. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.</p> <p>There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.</p> <p>Assumptions: No rock excavation is required. Only nominal dewatering is needed. No consideration for contaminated soils or hazardous materials is included (i.e. asbestos, lead, etc). Based on a normal 40 hour work week with no overtime.</p>
<b>Report format</b>	Sorted by 'Area/95CSI Sctrn/Element' 'Detail' summary Allocate addons Combine items

Spreadsheet Level	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
<b>05 Influent Diversion Pump Station</b>								
<b>02240 Dewatering for Diversion Pump Station</b>								
05.02240.1310 Bypass Pumping for 6 MGD	30.00 dy	11,623	40,374	1,623	35,848		2,982.30 /dy	89,469
05.02240.1400 Dewatering Sump Pump 1000 GPH	60.00 day	246	711		484		24.02 /day	1,441
<b>02240 Dewatering for Diversion Pump Station</b>		<b>11,869</b>	<b>41,086</b>	<b>1,623</b>	<b>36,332</b>			<b>90,910</b>
<b>02250 Sheet Piling and Shoring</b>								
05.02250.1400 Sheet Piling 40 Feet Pull and Salvage	7,600.00 sf			400,975			52.76 /sf	400,975
<b>02250 Sheet Piling and Shoring</b>				<b>400,975</b>				<b>400,975</b>
<b>02300 Earthwork</b>								
05.02300.1310 Excavate for Pump Station	2,196.00 cy	5,418	2,060	883	11,098		8.86 /cy	19,460
<b>02300 Earthwork</b>		<b>5,418</b>	<b>2,060</b>	<b>883</b>	<b>11,098</b>			<b>19,460</b>
<b>02800 Site Improvements</b>								
05.02800.1310 Fence & Gate	300.00 lf			50,487			168.29 /lf	50,487
<b>02800 Site Improvements</b>				<b>50,487</b>				<b>50,487</b>
<b>03300 Cast-in-Place Concrete</b>								
05.03300.1310 Pump Station Slab	104.00 cy	15,158	37,569	2,109	175	384	532.65 /cy	55,395
05.03300.1320 Pump Station Walls	208.00 cy	79,130	138,890	26,831	1,170	769	1,186.49 /cy	246,790
05.03300.1330 Pump Station Top Slab	117.00 cy	27,735	42,641	21,780	2,464	431	812.41 /cy	95,052
<b>03300 Cast-in-Place Concrete</b>		<b>122,024</b>	<b>219,101</b>	<b>50,720</b>	<b>3,809</b>	<b>1,584</b>		<b>397,237</b>
<b>05500 Metal Fabrications</b>								
05.05500.1310 Pump Station Hatches	3.00 ea	553	9,230				3,261.11 /ea	9,783
05.05500.1320 Stairs and Railings	43.00 trd	30,235	56,088		12,110		2,289.14 /trd	98,433
<b>05500 Metal Fabrications</b>		<b>30,789</b>	<b>65,318</b>		<b>12,110</b>			<b>108,216</b>
<b>11200 Water Treatment Equipment</b>								
05.11200.1320 Pump Alternative #3	3.00 ea	4,120	1,113,398		3,225	1,438	374,060.01 /ea	1,122,180
<b>11200 Water Treatment Equipment</b>		<b>4,120</b>	<b>1,113,398</b>		<b>3,225</b>	<b>1,438</b>		<b>1,122,180</b>
<b>13000 Special Construction</b>								
05.13000.1310 Electrical Enclosure	1.00 ea			32,654			32,654.06 /ea	32,654
<b>13000 Special Construction</b>				<b>32,654</b>				<b>32,654</b>
<b>13400 Measurement &amp; Control Instrumentation</b>								
05.13400.1310 PLC & Scada System	1.00 ls	2,479	110,763	10,552		141,530	265,324.01 /ls	265,324
05.13400.1320 I&C Devices	13.00 ea	2,252	21,774			2,083	2,008.35 /ea	26,109
05.13400.1330 I&C Conduit & Wire	1,000.00 lf	12,121	6,607				18.73 /lf	18,728
<b>13400 Measurement &amp; Control Instrumentation</b>		<b>16,853</b>	<b>139,144</b>	<b>10,552</b>		<b>143,613</b>		<b>310,161</b>
<b>15000 Process Mechanical</b>								
05.15000.1310 40 lf of 60" DIP for Connection to Existing	40.00 lf	4,068	44,532	227	1,999		1,270.65 /lf	50,826
05.15000.1320 20" BFV for Pumps	7.00 ea	6,067	32,037			18	5,445.93 /ea	38,122
05.15000.1330 20" CV for Pumps	5.00 ea	2,551	58,294			8	12,170.40 /ea	60,852
<b>15000 Process Mechanical</b>		<b>12,685</b>	<b>134,863</b>	<b>227</b>	<b>1,999</b>	<b>25</b>		<b>149,799</b>
<b>16090 Service &amp; Distribution</b>								
05.16090.1320 VFD - Option NO. 3	3.00 ea	8,200	749,053				252,417.59 /ea	757,253
05.16090.1330 1500 KW Generator	1.00 ea	5,744	713,823		1,502	19,880	740,949.39 /ea	740,949
05.16090.1350 25 KVA Transformer	1.00 ea	1,828	13,145				14,973.01 /ea	14,973
05.16090.1360 SWGR - Option NO. 3	1.00 ea	9,146	279,603		443		289,191.29 /ea	289,191
<b>16090 Service &amp; Distribution</b>		<b>24,917</b>	<b>1,755,624</b>		<b>1,945</b>	<b>19,880</b>		<b>1,802,366</b>
<b>16120 Building Lighting</b>								
05.16120.1310 Building Lighting	102.63 sf	4,557	5,682				99.76 /sf	10,239
<b>16120 Building Lighting</b>		<b>4,557</b>	<b>5,682</b>					<b>10,239</b>
<b>16130 Feeders</b>								
05.16130.1310 Power Authority Transformer to ATS Electrical Bldg	150.00 lf	42,440	197,066		137		1,597.63 /lf	239,644
05.16130.1320 SWGR to ATS	20.00 lf	11,535	55,275				3,340.52 /lf	66,810
05.16130.1330 ATS to Generator	50.00 lf	24,884	103,242		46		2,563.43 /lf	128,171
05.16130.1340 ATS to Generator (Control Wires)	50.00 lf	1,081	480				31.22 /lf	1,561
05.16130.1350 LP Panel to Generator Panel	50.00 lf	620	277				17.94 /lf	897
05.16130.1370 SWGR to Pumps(3ea) Option No. 3	300.00 lf	44,249	155,648		31		666.43 /lf	199,928
<b>16130 Feeders</b>		<b>124,809</b>	<b>511,988</b>		<b>214</b>			<b>637,012</b>
<b>05 Influent Diversion Pump Station</b>	<b>1.00 ls</b>	<b>358,040</b>	<b>3,988,263</b>	<b>548,121</b>	<b>70,731</b>	<b>166,540</b>	<b>5,131,696.29 /ls</b>	<b>5,131,696</b>
<b>06 Influent Channel in Wet Well</b>								
<b>03300 Cast-in-Place Concrete</b>								
06.03300.1400 Influent Channel Concrete Work	80.00 cy			88,961			1,112.02 /cy	88,961
<b>03300 Cast-in-Place Concrete</b>				<b>88,961</b>				<b>88,961</b>
<b>15000 Process Mechanical</b>								

Spreadsheet Level	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
06.15000.1400 Water Treatment Equipment	1.00 lot	3,009	223,526		1,679		228,214.74 /lot	228,215
06.15000.1401 Misc Piping Gates Screens	1.00 lot	26,687	546,961				573,648.67 /lot	573,649
15000 Process Mechanical		29,697	770,487		1,679			801,863
16000 Electrical Allowances/Miscellaneous								
06.16000.1400 Electrical and Instrumentation Grinder Pump	1.00 ls	18,234	48,755				66,988.30 /ls	66,988
16000 Electrical Allowances/Miscellaneous		18,234	48,755					66,988
06 Influent Channel in Wet Well		47,930	819,242	88,961	1,679			957,813
<b>07 Reward Well Connection</b>								
15000 Process Mechanical								
07.15000.1400 4 Inch PVC	450.00 lf	19,540	24,723	17,857	1,574		141.54 /lf	63,694
15000 Process Mechanical		19,540	24,723	17,857	1,574			63,694
07 Reward Well Connection		19,540	24,723	17,857	1,574			63,694
<b>20 Piping to Alternate WWTP - Alt No.3</b>								
02000 Sitework								
20.02000.1400 Asphalt Demolition and Disposal	41,376.00 sy			159,190			3.85 /sy	159,190
02000 Sitework				159,190				159,190
02600 Drainage & Containment								
20.02600.1310 24" DIP Excavation, Backfill & Dewatering	43,570.00 lf	165,090	107,351	249,505	175,654		16.01 /lf	697,601
20.02600.1315 24" DIP & Fittings	43,570.00 lf	822,666	11,735,027				288.22 /lf	12,557,692
20.02600.1330 36" DIP Excavation, Backfill & Dewatering	15,830.00 lf	59,981	39,003	91,891	63,819		16.09 /lf	254,695
20.02600.1335 36" DIP & Fittings	15,830.00 lf	465,661	7,569,846				507.61 /lf	8,035,507
02600 Drainage & Containment		1,513,398	19,451,227	341,397	239,474			21,545,495
02700 Base/Ballast/Pavements & Appurtenances								
20.02700.1310 Replace Pavement - 36" DIP (12, 315 sy) 8" Agg Base 2" Wearing Surface	12,315.00 sy			719,709			58.44 /sy	719,709
20.02700.1320 Replace Pavement - 20" DIP (29, 061 sy) 8" Agg Base 2" Wearing Surface	29,061.00 sy			1,698,373			58.44 /sy	1,698,373
02700 Base/Ballast/Pavements & Appurtenances				2,418,081				2,418,081
11200 Water Treatment Equipment								
20.11200.1310 Pasadena PS Pumps	1.00 ea	1,373	140,771		1,075	479	143,697.83 /ea	143,698
11200 Water Treatment Equipment		1,373	140,771		1,075	479		143,698
15000 Process Mechanical								
20.15000.1310 18" BFV at Pumps	7.00 ea	5,371	27,837			18	4,746.58 /ea	33,226
20.15000.1320 18" CV at Pumps	3.00 ea	2,216	49,311			8	17,178.23 /ea	51,535
15000 Process Mechanical		7,587	77,148			25		84,761
20 Piping to Alternate WWTP - Alt No.3		1,522,358	19,669,146	2,918,668	240,549	505		24,351,225
<b>30 Gravity Flow Modifications</b>								
02600 Drainage & Containment								
30.02600.1400 RCP Pipe 60" 14 Ft Invert	1,000.00 lf	101,407	225,167		126,823		453.40 /lf	453,397
30.02600.1401 PVC Pipe 8 Inch	500.00 lf	6,913	6,370		16,365		59.30 /lf	29,649
30.02600.1402 Junction Boxes 14 Foot Depth	2.00 ea	9,605	37,227	98	12,123		29,525.97 /ea	59,052
30.02600.1403 Storm Manhole 14 Foot Depth	1.00 ea	4,512	18,171	26	5,616		28,324.12 /ea	28,324
02600 Drainage & Containment		122,437	286,935	123	160,926			570,422
30 Gravity Flow Modifications		122,437	286,935	123	160,926			570,422
<b>35 Odor Control Equipment</b>								
15960 Odor Control								
35.15960.1400 Odor Control Wet Scrubber System 21 MGD Peak Flow	1.00 ls	11,865	550,348		6,574		568,787.19 /ls	568,787
15960 Odor Control		11,865	550,348		6,574			568,787
16000 Electrical Allowances/Miscellaneous								
35.16000.1400 Electrical Allowance for Hookup	48.00 ch	3,300					68.75 /ch	3,300
16000 Electrical Allowances/Miscellaneous	48.00	3,300					68.75	3,300
35 Odor Control Equipment		15,165	550,348		6,574			572,087

Estimate Totals

Description	Amount	Totals	Hours	Rate
Labor	2,085,471		41,613	hrs
Material	25,338,657			
Subcontract	3,573,731			
Equipment	482,033		8,738	hrs
Other	167,045			
	<u>31,646,937</u>	<b>31,646,937</b>		
<b>Total</b>		<b>31,646,937</b>		

**City of St. Petersburg, FL  
AWWRF Reject Pump Station  
Opinion of Probable Construction Cost, September 2010, Concept**

<b>Project name</b>	AWWRF Reject Pump Station
<b>Estimator</b>	DRC/MB
<b>Labor rate table</b>	FL10 Labor FL
<b>Equipment rate table</b>	00 10 Equip Rate
<b>Project Estimate Type</b>	PUMP Station OPCC
<b>Design Level</b>	XX %
<b>General Conditions</b>	X %
<b>OH and P</b>	X %
<b>Contingency</b>	XX %
<b>Escalation</b>	X %
<b>Owners Budget</b>	\$
<b>Budget Source</b>	\$
<b>Estimator</b>	DRC
<b>ENR 20 City CCI:</b>	July 2010: 8864.72
<b>Notes</b>	<p>This is an Opinion of Probable Construction Cost only, as defined by the documents provided at the level of design indicated above. CDM has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding (at least 3 each - both prime bidders and major subcontractors), market conditions or negotiating terms. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.</p> <p>There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.</p> <p>Assumptions: No rock excavation is required. Only nominal dewatering is needed. No consideration for contaminated soils or hazardous materials is included (i.e. asbestos, lead, etc). Based on a normal 40 hour work week with no overtime.</p>
<b>Report format</b>	Sorted by 'Area/95CSI Sctrn/Element' 'Detail' summary Allocate addons Combine items

Spreadsheet Level	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
<b>10 Reject Pump Station</b>								
<b>02000 Sitework</b>								
10.02000.1400 Asphalt Demolition and Disposal	9,005.00 sy			35,328			3.92 /sy	35,328
<b>02000 Sitework</b>				<b>35,328</b>				<b>35,328</b>
<b>02600 Drainage &amp; Containment</b>								
10.02600.1305 20" DIP Excavation, Backfill & Dewatering	13,500.00 lf	52,163	33,892	78,219	95,829		19.27 /lf	260,103
10.02600.1310 20" DIP & Fittings	13,500.00 lf	246,604	2,815,488				226.82 /lf	3,062,091
10.02600.1315 6" DIP Excavation, Backfill & Dewatering	1,000.00 lf	3,864	2,511	7,781	4,108		18.26 /lf	18,263
10.02600.1320 6" DIP & Fittings	1,000.00 lf	10,861	79,375				90.24 /lf	90,237
<b>02600 Drainage &amp; Containment</b>				<b>313,492</b>	<b>2,931,266</b>	<b>86,000</b>	<b>99,937</b>	<b>3,430,694</b>
<b>02700 Base/Ballast/Pavements &amp; Appurtenances</b>								
10.02700.1310 Replace Pavement - 20" DIP (9, 004 sy)8" Agg Base 2" Wearing Surface	9,004.50 sy			536,629			59.60 /sy	536,629
<b>02700 Base/Ballast/Pavements &amp; Appurtenances</b>				<b>536,629</b>				<b>536,629</b>
<b>11200 Water Treatment Equipment</b>								
10.11200.1400 Reject Pumps	2.00 ea	15,794	182,006		2,054	939	100,395.99 /ea	200,792
<b>11200 Water Treatment Equipment</b>				<b>15,794</b>	<b>182,006</b>	<b>2,054</b>	<b>939</b>	<b>200,792</b>
<b>13200 Tanks</b>								
10.13200.1310 7MG Reject Water Storage Tank	1.00 ea	1,308	12,101	3,713,379	1,262		3,728,050.08 /ea	3,728,050
<b>13200 Tanks</b>				<b>1,308</b>	<b>12,101</b>	<b>3,713,379</b>	<b>1,262</b>	<b>3,728,050</b>
<b>13400 Measurement &amp; Control Instrumentation</b>								
10.13400.1310 20" Venturi Meter	1.00 ea	1,106	18,980				20,085.80 /ea	20,086
10.13400.1320 6" Mag Meter	1.00 ea	319	4,659				4,977.72 /ea	4,978
10.13400.1400 Tanks Instrument and SCADA Interface				66,217				66,217
<b>13400 Measurement &amp; Control Instrumentation</b>				<b>1,425</b>	<b>23,638</b>	<b>66,217</b>		<b>91,281</b>
<b>15000 Process Mechanical</b>								
10.15000.1310 20" Check Valve	1.00 ea	844	16,150			3	16,996.92 /ea	16,997
10.15000.1320 20" MO Plug Valve	1.00 ea	1,003	13,098				14,101.00 /ea	14,101
10.15000.1330 6" MO Plug Valve	1.00 ea	376	7,257				7,633.40 /ea	7,633
10.15000.1340 16" BFV at Pumps	4.00 ea	2,838	12,388			10	3,808.99 /ea	15,236
10.15000.1350 12" CV at Pumps	2.00 ea	1,418	25,543			5	13,483.32 /ea	26,967
<b>15000 Process Mechanical</b>				<b>6,480</b>	<b>74,436</b>		<b>18</b>	<b>80,934</b>
<b>16000 Electrical Allowances/Miscellaneous</b>								
10.16000.1400 Electrical for Pumps and Tank	1.00 ls			206,930			206,929.52 /ls	206,930
<b>16000 Electrical Allowances/Miscellaneous</b>					<b>206,930</b>			<b>206,930</b>
<b>10 Reject Pump Station</b>			<b>338,498</b>	<b>3,223,447</b>	<b>4,644,484</b>	<b>103,252</b>	<b>957</b>	<b>8,310,638</b>

**Estimate Totals**

Description	Amount	Totals	Hours	Rate
Labor	338,498		6,941 hrs	
Material	3,223,447			
Subcontract	4,644,484			
Equipment	103,252		848 hrs	
Other	957			
	<u>8,310,638</u>	<b>8,310,638</b>		
<b>Total</b>		<b>8,310,638</b>		

**City of St Petersburg, FL  
 Albert Whitted WWTP Demolition  
 Opinion of Probable Construction Cost, September 2010, Concept**

<b>Project name</b>	Albert Whitted WWTP Demo
<b>Estimator</b>	DRC/MB
<b>Labor rate table</b>	FL10 Labor FL
<b>Equipment rate table</b>	00 10 Equip Rate
<b>Project Estimate Type</b>	Demolition of WWTP OPC
<b>Design Level</b>	Concept
<b>Estimator</b>	DRC
<b>ENR 20 City CCI:</b>	Aug 2010: 8837.37r
<b>Notes</b>	<p>This is an Opinion of Probable Construction Cost only, as defined by the documents provided at the level of design indicated above. CDM has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding (at least 3 each - both prime bidders and major subcontractors), market conditions or negotiating terms. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.</p> <p>There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.</p> <p>Assumptions:          No rock excavation is required.          Only nominal dewatering is needed.          No consideration for contaminated soils or hazardous materials is included (i.e. asbestos, lead, etc).          Based on a normal 40 hour work week with no overtime.</p>
<b>Report format</b>	Sorted by 'Area/95CSI Sctn/Element' 'Detail' summary Allocate addons Combine items

Spreadsheet Level	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
<b>05 Albert Whitted WWTP</b>								
<b>02220 Demolition</b>								
05.02220.1400 Equipment Removal and Salvage		386,335						386,335
05.02220.1401 Demolish Clarifiers				211,201				211,201
05.02220.1402 Demolish Digesters				105,600				105,600
05.02220.1403 Demolish Aerators				141,249				141,249
05.02220.1404 Demolish Filter Beds				85,758				85,758
05.02220.1405 Demolish Chlorine Contact				37,666				37,666
05.02220.1406 Demolish Headworks				18,161				18,161
05.02220.1407 Demolish Grit Area				11,771				11,771
05.02220.1408 Demolish Recalimed Water Basin				113,504				113,504
05.02220.1409 Demolish RAS Structure				5,045				5,045
05.02220.1410 Demolish Effluent Meter Vault				545				545
05.02220.1411 Demolish Tanks Polymer Alum Caustic Sodium Hypo and Diesel				43,047				43,047
05.02220.1412 Demolish Administration Buildings				48,697				48,697
05.02220.1413 Demolish Belt Filter Press Bldg				38,474				38,474
05.02220.1414 Demolish Gravity Belt Thickner Bldg				13,452				13,452
05.02220.1415 Demolish Metal Maintenance Bldgs				23,542				23,542
05.02220.1416 Demolish Main Electrical Generator Bldg				9,417				9,417
05.02220.1417 Demolish Oil Shed				2,018				2,018
05.02220.1418 Demolish Diesel Fuel Tank Bldg				1,345				1,345
05.02220.1419 Demolish MCC Bldgs				11,031				11,031
05.02220.1420 Miscellaneous Site Demolition				237,877				237,877
05.02220.1421 Water Truck and Driver for Job Duration		45,253				144,407	5,120	194,780
05.02220.1422 Site Silt Fencing and Maintenance		7,113	2,516					9,628
<b>02220 Demolition</b>		<b>438,700</b>	<b>2,516</b>	<b>1,159,399</b>	<b>144,407</b>	<b>5,120</b>		<b>1,750,141</b>
<b>02300 Earthwork</b>								
05.02300.1400 Cover Site with One Foot of Compacted Fill		37,399	311,061	155,043		82,070		585,573
<b>02300 Earthwork</b>		<b>37,399</b>	<b>311,061</b>	<b>155,043</b>		<b>82,070</b>		<b>585,573</b>
<b>02900 Planting</b>								
05.02900.1400 Hydoseed and Mulch Area				54,372				54,372
<b>02900 Planting</b>				<b>54,372</b>				<b>54,372</b>
<b>03300 Cast-in-Place Concrete</b>								
05.03300.1400 Flowable Grout Fill Pipes		14,422	467,855			5,354		487,631
<b>03300 Cast-in-Place Concrete</b>		<b>14,422</b>	<b>467,855</b>			<b>5,354</b>		<b>487,631</b>
<b>13000 Special Construction</b>								
13.13000.1400 Drain and Truck Water and Sludge - Digester Only		8,178	95,103	36,052				139,333
<b>13000 Special Construction</b>		<b>8,178</b>	<b>95,103</b>	<b>36,052</b>				<b>139,333</b>
<b>05 Albert Whitted WWTP</b>		<b>498,699</b>	<b>876,534</b>	<b>1,404,866</b>	<b>231,831</b>	<b>5,120</b>		<b>3,017,049</b>

**Estimate Totals**

Description	Amount	Totals	Hours	Rate
Labor	498,699		9,802 hrs	
Material	876,534			
Subcontract	1,404,866			
Equipment	231,831		1,665 hrs	
Other	5,120			
<b>Total Cost at:</b>	<b>3,017,050</b>	<b>3,017,050</b>		
Priced in 2010 Dollars		<b>3,017,050</b>		
<b>Total</b>		<b>3,017,050</b>		

## **Appendix C**

### **Alternate Present Worth Analyses**

Alternate Analysis with  
4% Discount Rate  
0% Inflation

## Appendix C -Table 5-1 Summary of New Capital Costs

## Alternative with 0% Inflation/4% Discount Rate

Summary of Capital Costs			
	AWWRF OPERATIONAL - Capital Costs 2011 \$	AWWRF DIVERSION TO SWWRF 2011 \$	AWWRF DIVERSION TO SWWRF AND NWWRF 2011 \$
Land Costs (2010 \$ - no inflation)	\$4,900,000		
Capital Costs			
Reject Water Pump Station - Pumps, Electrical, Meters	575,000		
Reject Water Pump Station - Tank	4,289,500		
Reject Water Pump Station - Piping	4,692,000		
Pipe Installation for Conveyance		\$21,168,000	\$26,992,000
Pump Station at AWWRF - Gravity Pipe Modifications		690,000	690,000
Reward Well Piping Connection		115,000	115,000
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation		3,795,000	5,405,000
Pump Station at AWWRF - Structure		2,070,000	2,185,000
Reclaimed Water 2 MG Storage Tank		1,725,000	1,725,000
Extra Pump at Pasadena Pump Station			224,000
Demolition Costs		3,450,000	3,450,000
<b>Total Capital Costs</b>	<b>\$14,456,500</b>	<b>\$33,013,000</b>	<b>\$40,786,000</b>

## Appendix C - Table 5-2 New Capital Costs - Salvage Value

## Alternative with 0% Inflation/4% Discount Rate

	Useful Life	Cost in 2011 Dollars <sup>a</sup>	Expired Study Period Years (Dec. 2030 - Jan. 2011)	Accumulated Depreciation <sup>b</sup>	Salvage Value <sup>c</sup>
<b>AWWRF Operational</b>					
Land Costs	N/A	\$4,900,000		\$0	\$4,900,000
Reject Water Pump Station - Mechanical, Electrical, Instrumentation	15	575,000	20	575,000	-
Reject Water Pump Station - Tank	40	4,289,500	20	2,144,750	2,144,750
Reject Water Pump Station - Piping	45	4,692,000	20	2,085,333	2,606,667
<b>Total</b>		<b>\$14,456,500</b>		<b>\$4,805,083</b>	<b>\$9,651,417</b>
<b>AWWRF DIVERSION TO SWWRF</b>					
Pipe Installation for Conveyance	45	\$21,168,000	20	\$9,408,000	\$11,760,000
Pump Station at AWWRF - Gravity Pipe Modifications	45	690,000	20	306,667	383,333
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation	15	3,795,000	20	3,795,000	-
Reward Well Future Connection to Pump Station	45	115,000	20	51,111	63,889
Reclaimed Water 2 MG Storage Tank	40	1,725,000	20	862,500	862,500
Pump Station at AWWRF - Structure	20	2,070,000	20	2,070,000	-
<b>Total</b>		<b>\$29,563,000</b>		<b>\$16,493,278</b>	<b>\$13,069,722</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>					
Pipe Installation for Conveyance	45	\$26,992,000	20	\$11,996,444	\$14,995,556
Pump Station at AWWRF - Gravity Pipe Modifications	45	690,000	20	306,667	383,333
Reward Well Future Connection to Pump Station	45	115,000	20	51,111	63,889
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation	15	5,405,000	20	5,405,000	-
Pump Station at AWWRF - Structure	20	2,185,000	20	2,185,000	-
Reclaimed Water 2 MG Storage Tank	40	1,725,000	20	862,500	862,500
Extra Pump at Pasadena Pump Station	15	224,000	20	224,000	-
<b>Total</b>		<b>\$37,336,000</b>		<b>\$21,030,722</b>	<b>\$16,305,278</b>

<sup>a</sup>Costs taken from Table 5-1 in 2011 \$.

<sup>b</sup>Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>c</sup>Salvage value equals cost less depreciation.

**Appendix C - Table 5-3 New Capital Cost Renewal & Replacement - Salvage Value**  
**Alternative with 0% Inflation/4% Discount Rate**

	Useful Life	Cost in Year 2026 <sup>a</sup>	Expired Study Period Years (Dec. 2030 - Jan. 2026)	Accumulated Depreciation <sup>b</sup>	Salvage Value <sup>c</sup>
<b>AWWRF Operational</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Reject Pump Station	15	\$167,262	5	\$55,754	\$111,508
<b>Total</b>		\$167,262		\$55,754	\$111,508
<b>AWWRF DIVERSION TO SWWRF</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Flow Diversion Pump Station	15	\$1,776,536	5	\$592,179	\$1,184,357
<b>Total</b>		\$1,776,536		\$592,179	\$1,184,357
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Flow Diversion Pump Station	15	\$2,636,007	5	\$878,669	\$1,757,338
Additional pump at Pasadena PS	15	90,837	5	30,279	60,558
<b>Total</b>		\$2,726,844		\$908,948	\$1,817,896

<sup>a</sup>The costs in 2010 \$ were as follows:

AWWRF - Reject Water Pump Station - Mechanical, Electrical, Instrumentation	\$167,262
AWWRF - Diversion to SWWRF Pump Station - Mechanical, Electrical, Instrumentation	\$1,776,536
AWWRF - Diversion to SWWRF & NWWRF Pump Station - Mechanical, Electrical, Instrumentation	\$2,636,007
AWWRF Diversion to SWWRF & NWWRF - Pasadena Pump	\$90,837

<sup>b</sup>Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>c</sup>Salvage value equals cost less depreciation.

Appendix C - Table 5-4 AWWRF Operational - Renewal & Replacement (CIP) Cost Summary

Alternative with 0% Inflation/4% Discount Rate

Item #	AWWRF Capital/Rehab Items	No. Cycles	2010 \$ <sup>a</sup>	Cycle 1 R&R Year <sup>b</sup>	Cycle 1 R&R Cost <sup>c</sup>	Cycle 2 R&R Year <sup>b</sup>	Cycle 2 R&R Cost <sup>c</sup>	Cycle 3 R&R Year <sup>b</sup>	Cycle 3 R&R Cost <sup>c</sup>
1	Admin Building Rehab	1	\$300,000	2013	\$300,000				
1	Admin Building Rehab	1	\$3,000,000	2014	\$3,000,000				
2	Aeration - Aerator Gear Box Rebuild (6 - 3 @ a time)	3	65,000	2011	65,000	2019	\$65,000	2027	\$65,000
3	Aeration - Aerator Gear Box Rebuild (6 - 3 @ a time)	3	65,000	2013	65,000	2021	\$65,000	2029	\$65,000
4	Aeration - New Aerator Gear Box (2 @ a time)	2	120,000	2011	120,000	2026	\$120,000		
5	Biosolids Dewatering Replacement	2	150,000	2014	150,000	2029	\$150,000		
5	Biosolids Dewatering Replacement	2	3,000,000	2015	3,000,000	2030	\$3,000,000		
6	CCC Expansion	1	100,000	2012	100,000				
6	CCC Expansion	1	850,000	2013	850,000				
7	Clarifier #1 & #2 Modification	1	2,600,000	2022	2,600,000				
8	Clarifier #3 & #4 Modification	1	2,600,000	2022	2,600,000				
9	Digester Cover Replacement	1	750,000	2012	750,000				
9	Digester Cover Replacement	1	1,750,000	2013	1,750,000				
10	Digester Mixer Replacement (3)	2	300,000	2011	300,000	2026	300,000		
11	Digester Mixer Replacement (3)	2	300,000	2012	300,000	2027	300,000		
12	Digester Mixer Replacement (3)	2	300,000	2013	300,000	2028	300,000		
13	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2011	120,000	2021	120,000		
14	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2012	120,000	2022	120,000		
15	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2013	120,000	2023	120,000		
16	Final Distribution Pump Replacement (4)	2	80,000	2011	80,000	2026	80,000		
17	Final Distribution Pump Replacement (4)	2	80,000	2012	80,000	2027	80,000		
18	Final Distribution Pump Replacement (4)	2	80,000	2013	80,000	2028	80,000		
19	Final Distribution Pump Replacement (4)	2	80,000	2014	80,000	2029	80,000		
20	GBT Replacement	1	1,000,000	2017	1,000,000				
20	Generator Addition	2	150,000	2011	150,000	2026	150,000		
21	Generator Addition	2	1,500,000	2012	1,500,000	2027	1,500,000		
22	Headworks - Rebuild Fine Barscreens #1 & #2	2	200,000	2013	200,000	2028	200,000		
23	Headworks - Rebuild Fine Barscreens #1 & #2	2	200,000	2014	200,000	2029	200,000		
24	Headworks Rehab - Structure	1	300,000	2012	300,000				
25	Influent Pumping Station with Lift Station Mods	1	8,592,000	2011	8,592,000				
26	Influent Pump & VFD Replacement (4 - 2 @ a time)	2	130,000	2011	130,000	2026	130,000		
27	Influent Pump & VFD Replacement (4 - 2 @ a time)	2	130,000	2012	130,000	2027	130,000		
28	In-Plant Lift Station	1	250,000	2011	250,000				
29	Low head Pump/Motor Replacement (4)	2	60,000	2011	60,000	2026	60,000		
30	Low head Pump/Motor Replacement (4)	2	60,000	2012	60,000	2027	60,000		
31	Low head Pump/Motor Replacement (4)	2	60,000	2013	60,000	2028	60,000		
32	Low head Pump/Motor Replacement (4)	2	60,000	2014	60,000	2029	60,000		
33	Solids - New GBT	2	1,500,000	2013	1,500,000	2028	1,500,000		
34	Polymer Unit Replacement	2	150,000	2011	150,000	2026	150,000		
35	Process Equipment Replacement	2	310,000	2011	310,000	2026	310,000		
36	Process Equipment Replacement	2	580,000	2012	580,000	2027	580,000		
37	Process Equipment Replacement	2	570,000	2013	570,000	2028	570,000		
38	Process Equipment Replacement	2	300,000	2014	300,000	2029	300,000		
39	Process Equipment Replacement	2	460,000	2015	460,000	2030	460,000		
40	Return Sludge Replacement (2)	2	60,000	2011	60,000	2026	60,000		
41	Return Sludge Replacement (2)	2	60,000	2012	60,000	2027	60,000		
42	SCADA Phase 2	2	250,000	2011	250,000	2026	250,000		
43	Side Stream Lift Station	1	500,000	2011	500,000				
44	Waste Sludge Pump Replacement	2	100,000	2011	100,000	2026	100,000		
	<b>Totals</b>		<b>\$34,462,000</b>		<b>\$34,462,000</b>		<b>\$11,870,000</b>		<b>\$130,000</b>

<sup>a</sup>The costs for the initial replacement is presented in 2010 \$.

<sup>b</sup>This is the actual year of replacement for each cycle.

<sup>c</sup>The costs for each item are inflated to the year of replacement for each cycle.

Appendix C - Table 5-5 AWWRF - Renewal & Replacement Cost Salvage Value

Alternative with 0% Inflation/4% Discount Rate

Item Numbers <sup>a</sup>	Useful Life <sup>b</sup>	Last Installation Year <sup>c</sup>	Cost in Year XXXX <sup>d</sup>	Expired Study Period Years (Dec. 2030 - Jan. XXXX) <sup>e</sup>	Accumulated Depreciation <sup>f</sup>	Salvage Value <sup>g</sup>
Items #2	8	2027	65,000	4	32,500	32,500
Items #3	8	2029	65,000	2	16,250	48,750
Items #13	10	2021	120,000	10	120,000	-
Items #14	10	2022	120,000	9	108,000	12,000
Items #15	10	2023	120,000	8	96,000	24,000
Items #20	15	2017	1,000,000	14	933,333	66,667
Items #7, 8	15	2022	5,200,000	9	3,120,000	2,080,000
Items #4, 10, 16, 20, 26, 29, 34, 35, 40, 42, 44	15	2026	1,710,000	5	570,000	1,140,000
Items #11, 17, 21, 27, 30, 36, 41	15	2027	2,710,000	4	722,667	1,987,333
Items #12, 18, 22, 31, 33, 37	15	2028	2,710,000	3	542,000	2,168,000
Items #19, 23, 32, 38	15	2029	640,000	2	85,333	554,667
Items #5, 39	15	2030	3,610,000	1	240,667	3,369,333
Items #25, 28, 43	20	2011	9,342,000	20	9,342,000	-
Items #24	20	2012	300,000	19	285,000	15,000
Items #9	20	2013	2,500,000	18	2,250,000	250,000
Items #1	20	2014	3,300,000	17	2,805,000	495,000
Items #6	40	2013	950,000	18	427,500	522,500
<b>Totals</b>			<b>\$34,462,000</b>		<b>\$21,696,250</b>	<b>\$12,765,750</b>

<sup>a</sup>The item numbers identify the costs from Table 5-4.

<sup>b</sup>The useful life was provided by City staff.

<sup>c</sup>The last installation year equals the year in which there is a remaining useful life.

<sup>d</sup>The cost in this column equals the cost in the year of replacement for the last installation year for that item.

<sup>e</sup>The expired study period years equals Dec. 2030 less the last installation year.

<sup>f</sup>Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>g</sup>Salvage value equals cost less depreciation.

### Appendix C - Table 5-6 Operation & Maintenance Costs

#### Alternative with 0% Inflation/4% Discount Rate

	Annual Escalation Rate	2010 \$	2011 \$
<b>AWWRF Operational</b>			
Existing O&M Costs <sup>a</sup>	0.00%	\$3,101,721	\$3,101,721
Electricity - Reject Water Pumping <sup>b</sup>	0.00%	8,491	8,491
Maintenance - Reject Water Pumping <sup>c</sup>	0.00%	26,000	26,000
<b>Total Annual O&amp;M - AWWRF</b>		<b>\$3,136,212</b>	<b>\$3,136,212</b>
One Time Cost -Rehab - Reject Water Pumps (2)(costs in 2010 & 2019 \$) <sup>d</sup>	0.00%	<b>\$20,000</b>	<b>\$20,000</b>
<b>AWWRF DIVERSION TO SWWRF</b>			
Electricity - AWWRF Pump Station <sup>b</sup>	0.00%	\$127,364	\$127,364
Odor Control & Maintenance - AWWRF Pump Station <sup>e</sup>	0.00%	74,020	74,020
Increased O&M Costs - SWWRF <sup>f</sup>	0.00%	1,327,358	1,327,358
Land Lease Costs <sup>g</sup>	0.00%	92,112	92,112
<b>Total Annual O&amp;M - Diversion to SWWRF</b>		<b>\$1,620,854</b>	<b>\$1,620,854</b>
One Time Cost -Rehab Diversion Pumps (3)(costs in 2010 & 2019 \$) <sup>d</sup>	0.00%	<b>\$30,000</b>	<b>\$30,000</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>			
Electricity - AWWRF Pump Station <sup>b</sup>	0.00%	\$131,543	\$131,543
Odor Control & Maintenance - AWWRF Pump Station <sup>e</sup>	0.00%	74,020	74,020
Electricity - Pasadena Pump Station <sup>b</sup>	0.00%	25,041	25,041
Increased O&M Costs - SWWRF and NWWRF <sup>f</sup>	0.00%	1,321,896	1,321,896
Land Lease Costs <sup>g</sup>	0.00%	92,112	92,112
<b>Total Annual O&amp;M - Diversion to SWWRF &amp; NWWRF</b>		<b>\$1,644,612</b>	<b>\$1,644,612</b>
One Time Cost -Rehab Diversion Pumps (3)(costs in 2010 & 2019 \$) <sup>d</sup>	0.00%	<b>\$30,000</b>	<b>\$30,000</b>
in 2010 & 2019 \$) <sup>d</sup>	0.00%	<b>\$10,000</b>	<b>\$10,000</b>

<sup>a</sup>The existing O&M costs for AWWRF equal the FY2009 costs increased by 3% inflation annually.

<sup>b</sup>FY2009 costs at various pump stations were used to estimate the electrical costs for the new pumping requirements.

<sup>c</sup>Based on 1/2 of a 2 person crew at 10 hours each/week. A loaded rate of \$50/hour was used.

<sup>d</sup>Pump rehab costs were estimated at \$10,000 each, inflated at 3% annually to 2019.

<sup>e</sup>Odor control and maintenance based on existing pump station costs, with a 2 person crew working 10 hours/wk each at a \$50/hour loaded rate.

<sup>f</sup>Electrical, chemical, sludge costs were based on actual FY2009 costs adjusted for the quantity of flow diverted.

Personnel costs were estimated, based on new staffing requirements.

<sup>g</sup>Land lease costs are estimated to equal 1/2 of the existing cost.

**Appendix C -Table 5-7 AWWRF Operational - Present Worth New Capital Costs and Salvage Value  
Alternative with 0% Inflation/4% Discount Rate**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF Operational</b>			
Land Costs	\$4,900,000	1.0000	\$4,900,000
Capital Costs	9,556,500	1.0000	9,556,500
Demolition Costs	-		-
<b>Subtotal Capital Costs</b>	<b>\$14,456,500</b>		<b>\$14,456,500</b>
Salvage Value of Capital Cost Table 6-2	(9,651,417)	0.4564	(4,404,781)
<b>AWWRF Operational - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$4,805,083</b>		<b>\$10,051,719</b>

<sup>a</sup>Taken from Table 5-2.

<sup>b</sup>Present worth equals the capital costs times the present worth factor.

<sup>c</sup>Equals capital costs less the salvage value.

**Appendix C - Table 5-8 SWWRF Diversion - Present Worth New Capital Costs and Salvage Value  
Alternative with 0% Inflation/4% Discount Rate**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF DIVERSION TO SWWRF</b>			
Land Costs	-	1.0000	-
Capital Costs	\$29,563,000	1.0000	\$29,563,000
Demolition Costs	3,450,000	1.0000	3,450,000
<b>Subtotal Option 1 Capital Costs</b>	<b>\$33,013,000</b>		<b>\$33,013,000</b>
Salvage Value of Capital Cost Table 6-2	(13,069,722)	0.4564	(5,964,851)
<b>AWWRF Diversion to SWWRF - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$19,943,278</b>		<b>\$27,048,149</b>

<sup>a</sup>Taken from Table 5-2.

<sup>b</sup>Present worth equals the capital costs times the present worth factor.

<sup>c</sup>Equals capital costs less the salvage value.

**Appendix C - Table 5-9 SWWRF & NWWRF Diversion - Present Worth New Capital Costs and Salvage  
Value**

**Alternative with 0% Inflation/4% Discount Rate**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>			
Land Costs	-	1.0000	-
Capital Costs	\$37,336,000	1.0000	\$37,336,000
Demolition Costs	3,450,000	1.0000	3,450,000
<b>Subtotal Option 2 Capital Costs</b>	<b>\$40,786,000</b>		<b>\$40,786,000</b>
Salvage Value of Capital Cost Table 6-2	(16,305,278)	0.4564	(7,441,516)
<b>AWWRF Diversion to SWWRF &amp; NWWRF - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$24,480,722</b>		<b>\$33,344,484</b>

<sup>a</sup>Taken from Table 5-2.

<sup>b</sup>Present worth equals the capital costs times the present worth factor.

<sup>c</sup>Equals capital costs less the salvage value.

**Appendix C - Table 5-10 AWWRF Operational - Present Worth of Replacement & Rehabilitation and Salvage Value**

Alternative with 0% Inflation/4% Discount Rate

	Replacement Year	Table 5-4 Replacement Costs <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF Operational</b>				
Items Replaced in 2011	2011	11,237,000	0.9615	10,804,808
Items Replaced in 2012	2012	3,980,000	0.9246	3,679,734
Items Replaced in 2013	2013	5,795,000	0.8890	5,151,734
Items Replaced in 2014	2014	3,790,000	0.8548	3,239,708
Items Replaced in 2015	2015	3,460,000	0.8219	2,843,868
Items Replaced in 2017	2017	1,000,000	0.7599	759,918
Items Replaced in 2019	2019	65,000	0.7026	45,668
Items Replaced in 2021	2021	185,000	0.6496	120,172
Items Replaced in 2022	2022	5,320,000	0.6246	3,322,856
Items Replaced in 2023	2023	120,000	0.6006	72,069
Items Replaced in 2026	2026	1,710,000	0.5339	912,983
Items Replaced in 2027	2027	2,775,000	0.5134	1,424,611
Items Replaced in 2028	2028	2,710,000	0.4936	1,337,732
Items Replaced in 2029	2029	855,000	0.4746	405,819
Items Replaced in 2030	2030	3,460,000	0.4564	1,579,099
<b>Subtotal Replacement Cost Value</b>		<b>\$46,462,000</b>		<b>\$35,700,779</b>
	Replacement Year	Table 5-3 Replacement Costs <sup>c</sup>	Present Worth Factor	Present Worth <sup>b</sup>
R&R New Pumps and Meters	2026	167,262	0.5339	89,303
<b>Subtotal Replacement Cost Value</b>		<b>\$167,262</b>		<b>\$89,303</b>
	Replacement Year	Table 5-3 Salvage Value <sup>c</sup>	Present Worth Factor	Present Worth <sup>b</sup>
R&R New Pumps and Meters	2026	(\$111,508)	0.4564	(\$50,891)
<b>Subtotal Salvage Cost Value</b>		<b>(\$111,508)</b>		<b>(\$50,891)</b>
	Last Replacement Year	Table 5-5 Salvage Value <sup>d</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>Subtotal Salvage Cost Value</b>		<b>(12,765,750)</b>	<b>0.4564</b>	<b>(\$5,826,122)</b>
<b>AWWRF Operational - Total Replacement &amp; Salvage Cost Value<sup>e</sup></b>		<b>\$33,752,004</b>		<b>\$29,913,069</b>

<sup>a</sup>Taken from Table 5-4, with amounts equal to Cycle 1, 2 and 3 costs arranged by year of replacement.

<sup>b</sup>Present worth equals the replacement cost or salvage value times the present worth factor.

<sup>c</sup>Replacement costs and Salvage Value taken from Table 5-3.

<sup>d</sup>Salvage value equals the total from Table 6-5 multiplied by the present worth factor in 2030.

<sup>e</sup>The totals equal the replacement costs and replacement cost present worth plus the salvage value and salvage value present worth.

**Appendix C - Table 5-11 AWWRF Diversions - Present Worth of Replacement & Rehabilitation and Salvage Value**

**Alternative with 0% Inflation/4% Discount Rate**

<b>AWWRF DIVERSION TO SWWRF</b>	<b>Replacement Year</b>	<b>Table 5-3 Replacement Costs<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	\$1,776,536	0.5339	\$948,507
<b>Total Replacement Cost Value</b>		<b>\$1,776,536</b>		<b>\$948,507</b>
	<b>Replacement Year</b>	<b>Table 5-3 Salvage Value<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	(\$1,184,357)	0.4564	(\$540,525)
<b>Value AWWRF Diversion to SWWRF<sup>c</sup></b>		<b>\$592,179</b>		<b>\$407,982</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>	<b>Replacement Year</b>	<b>Table 5-3 Replacement Costs<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
AWWRF R&R New Pumps and Meters	2026	\$2,636,007	0.5339	\$1,407,386
Additional pump at Pasadena PS	2026	90,837	0.5339	48,498
<b>Total Replacement Cost Value</b>		<b>\$2,726,844</b>		<b>\$1,455,884</b>
	<b>Replacement Year</b>	<b>Table 5-3 Salvage Value<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R Costs for New Pumps & Motors	2026	(\$1,757,338)	0.4564	(\$802,026)
R&R Costs for Pasadena Pumps & M	2026	(60,558)	0.4564	(\$27,638)
<b>Subtotal Salvage Cost Value</b>		<b>(\$1,817,896)</b>		<b>(\$829,664)</b>
<b>Total Replacement &amp; Salvage Cost Value AWWRF Diversion to SWWRF &amp; NWWRF<sup>c</sup></b>		<b>\$908,948</b>		<b>\$626,220</b>

<sup>a</sup>Replacement costs and Salvage Value taken from Table 5-3.

<sup>b</sup>Present worth equals the replacement cost or salvage value times the present worth factor.

<sup>c</sup>The totals equal the replacement costs and replacement cost present worth plus the salvage value and salvage

**Appendix C - Table 5-12 AWWRF Operational - Present Worth of Operation and Maintenance Costs**  
**Alternative with 0% Inflation/4% Discount Rate**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 0% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
<b>AWWRF Operational</b>					
Existing O&M Costs	\$3,101,721	20.0000	\$62,034,422		\$43,839,538
Electricity - Reject Water Pumping	8,491	20.0000	169,819		120,010
Maintenance - Reject Water Pumping	26,000	20.0000	520,000		367,482
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$3,136,212</b>		<b>\$62,724,241</b>		
Rehab - Reject Water Pumps (2019 \$)	\$20,000	1.0000	\$20,000	0.7026	14,052
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Operational</b>					<b>\$44,341,083</b>

<sup>a</sup>O&M costs taken from Table 5-6.

<sup>b</sup>Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup>Present worth is the accumulation of the O&M costs from 2011 through 2030 times the present worth factor for each year.

**Appendix C - Table 5-13 AWWRF Diversion to SWWRF - Present Worth of Operation and Maintenance**  
**Alternative with 0% Inflation/4% Discount Rate**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 0% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
Electricity - AWWRF Pump Station	\$127,364	20.0000	\$2,547,283		\$1,800,157
Odor Control & Maintenance - AWWRF Pump Station	74,020	20.0000	1,480,400		1,046,194
Increased O&M Costs at SWWRF	1,327,358	20.0000	26,547,158		18,760,796
Land Lease Costs	92,112	20.0000	1,842,240		1,301,905
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$1,620,854</b>		<b>\$32,417,082</b>		
Rehab - Diversion Pumps (2019 \$)	\$30,000	1.0000	\$30,000	0.7026	21,078
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Diversion to SWWRF</b>					<b>\$22,930,131</b>

<sup>a</sup>O&M costs taken from Table 5-6.

<sup>b</sup>Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup>Present worth is the accumulation of the O&M costs from 2011 through 2030 times the present worth factor for each year.

**Appendix C - Table 5-14 AWWRF Diversion to SWWRF & NWWRF - Present Worth of Operation and Maintenance**  
**Alternative with 0% Inflation/4% Discount Rate**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 0% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
Electricity - AWWRF Pump Station	\$131,543	20.0000	\$2,630,863		\$1,859,223
Odor Control & Maintenance - AWWRF Pump Station	74,020	20.0000	1,480,400		1,046,194
Electricity - Pasadena Pump Station	25,041	20.0000	500,825		353,931
Increased Marginal Costs	1,321,896	20.0000	26,437,920		18,683,598
Land Lease Costs	92,112	20.0000	1,842,240		1,301,905
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$1,644,612</b>		<b>\$32,892,248</b>		
Rehab - Diversion Pumps (2019 \$)	\$30,000	1.0000	\$30,000	0.7026	21,078
Rehab - Pasadena Pump (2019 \$)	\$10,000	1.0000	\$10,000	0.7026	7,026
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Diversion to SWWRF &amp; NWWRF</b>					<b>\$23,272,955</b>

<sup>a</sup>O&M costs taken from Table 5-6.

<sup>b</sup>Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup>Present worth is the accumulation of the O&M costs from 2010 through 2030 times the present worth factor for each year.

**Appendix C - Table 5-15 Present Worth Summary - No Inflation**

**Alternative with 0% Inflation/4% Discount Rate**

	<b>AWWRF OPERATIONAL - Present Worth for Study Period</b>	<b>AWWRF DIVERSION TO SWWRF Present Worth for Study Period</b>	<b>AWWRF DIVERSION TO SWWRF AND NWWRF Present Worth for Study Period</b>
Capital Costs			
New Capital Costs - Net of Salvage Value <sup>a</sup>	\$10,051,719	\$27,048,149	\$33,344,484
Replacement (CIP) Costs Net of Salvage Value <sup>b</sup>	29,913,069	407,982	626,220
Operation & Maintenance Costs <sup>c</sup>	44,341,083	22,930,131	23,272,955
<b>Total Present Worth Option 1</b>	<b>\$84,305,871</b>	<b>\$50,386,262</b>	<b>\$57,243,660</b>

<sup>a</sup>Taken from Tables 5-7, 5-8, 5-9.

<sup>b</sup>Taken from Tables 5-10, 5-11.

<sup>c</sup>Taken from Tables 5-12, 5-13, 5-14.

**Table 5-16 AWWRF and Diversions Annual Cash Flow**  
**Alternative with 0% Inflation/4% Discount Rate**

	<b>AWWRF Operational</b>	<b>AWWRF DIVERSION TO SWWRF</b>	<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>
Capital Costs - New			
New Capital Costs - 2011 \$	\$9,556,500	\$29,563,000	\$37,336,000
Land	4,900,000		
Demolition Costs	-	3,450,000	3,450,000
Capital Costs - Replacement (CIP)			
'2011	11,237,000.00		
'2012	3,980,000.00		
'2013	5,795,000.00		
'2014	3,790,000.00		
'2015	3,460,000.00		
Total	\$42,718,500	\$33,013,000	\$40,786,000
Annual Debt Service (5%,20 yrs.)	\$3,427,843	\$2,649,049	\$3,272,774
Change in O&M Costs	\$34,491	(\$1,573,919)	(\$1,550,160)
Annual Cash Increase (Decrease)	\$3,462,334	\$1,075,130	\$1,722,614
Annual Savings from Diversion		\$2,387,204	\$1,739,720

Alternate Analysis with  
4% Discount Rate  
2.5% Inflation  
6.6% Nominal Discount Rate

Appendix C - Table 5-1 Summary of New Capital Costs

Alternative with 2.5% Inflation/4% Discount Rate

Summary of Capital Costs			
	AWWRF OPERATIONAL - Capital Costs 2011 \$	AWWRF DIVERSION TO SWWRF 2011 \$	AWWRF DIVERSION TO SWWRF AND NWWRF 2011 \$
Land Costs (2010 \$ - no inflation)	\$4,900,000		
Capital Costs			
Reject Water Pump Station - Pumps, Electrical, Meters	589,375		
Reject Water Pump Station - Tank	4,396,738		
Reject Water Pump Station - Piping	4,809,300		
Pipe Installation for Conveyance		\$21,697,200	\$27,666,800
Pump Station at AWWRF - Gravity Pipe Modifications		707,250	707,250
Reward Well Piping Connection		117,875	117,875
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation		3,889,875	5,540,125
Pump Station at AWWRF - Structure		2,121,750	2,239,625
Reclaimed Water 2 MG Storage Tank		1,768,125	1,768,125
Extra Pump at Pasadena Pump Station			229,600
Demolition Costs		3,536,250	3,536,250
<b>Total Capital Costs</b>	<b>\$14,695,413</b>	<b>\$33,838,325</b>	<b>\$41,805,650</b>

## Appendix C - Table 5-2 New Capital Costs - Salvage Value

## Alternative with 2.5% Inflation/4% Discount Rate

	Useful Life	Cost in 2011 Dollars <sup>a</sup>	Expired Study Period Years (Dec. 2030 - Jan. 2011)	Accumulated Depreciation <sup>b</sup>	Salvage Value <sup>c</sup>
<b>AWWRF Operational</b>					
Land Costs	N/A	\$4,900,000		\$0	\$4,900,000
Reject Water Pump Station - Mechanical, Electrical, Instrumentation	15	589,375	20	589,375	-
Reject Water Pump Station - Tank	40	4,396,738	20	2,198,369	2,198,369
Reject Water Pump Station - Piping	45	4,809,300	20	2,137,467	2,671,833
<b>Total</b>		<b>\$14,695,413</b>		<b>\$4,925,210</b>	<b>\$9,770,202</b>
<b>AWWRF DIVERSION TO SWWRF</b>					
Pipe Installation for Conveyance	45	\$21,697,200	20	\$9,643,200	\$12,054,000
Pump Station at AWWRF - Gravity Pipe Modifications	45	707,250	20	314,333	392,917
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation	15	3,889,875	20	3,889,875	-
Reward Well Future Connection to Pump Station	45	117,875	20	52,389	65,486
Reclaimed Water 2 MG Storage Tank	40	1,768,125	20	884,063	884,063
Pump Station at AWWRF - Structure	20	2,121,750	20	2,121,750	-
<b>Total</b>		<b>\$30,302,075</b>		<b>\$16,905,610</b>	<b>\$13,396,465</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>					
Pipe Installation for Conveyance	45	\$27,666,800	20	\$12,296,356	\$15,370,444
Pump Station at AWWRF - Gravity Pipe Modifications	45	707,250	20	314,333	392,917
Reward Well Future Connection to Pump Station	45	117,875	20	52,389	65,486
Pump Station at AWWRF - Mechanical, Electrical, Instrumentation	15	5,540,125	20	5,540,125	-
Pump Station at AWWRF - Structure	20	2,239,625	20	2,239,625	-
Reclaimed Water 2 MG Storage Tank	40	1,768,125	20	884,063	884,063
Extra Pump at Pasadena Pump Station	15	229,600	20	229,600	-
<b>Total</b>		<b>\$38,269,400</b>		<b>\$21,556,490</b>	<b>\$16,712,910</b>

<sup>a</sup>Costs taken from Table 5-1 in 2011 \$.

<sup>b</sup>Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>c</sup>Salvage value equals cost less depreciation.

**Appendix C - Table 5-3 New Capital Cost Renewal & Replacement - Salvage Value**

**Alternative with 2.5% Inflation/4% Discount Rate**

	Useful Life	Cost in Year 2026 <sup>a</sup>	Expired Study Period Years (Dec. 2030 - Jan. 2026)	Accumulated Depreciation <sup>b</sup>	Salvage Value <sup>c</sup>
<b>AWWRF Operational</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Reject Pump Station	15	\$248,302	5	\$82,767	\$165,535
<b>Total</b>		\$248,302		\$82,767	\$165,535
<b>AWWRF DIVERSION TO SWWRF</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Flow Diversion Pump Station	15	\$2,637,278	5	\$879,093	\$1,758,185
<b>Total</b>		\$2,637,278		\$879,093	\$1,758,185
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>					
R&R Mechanical, Electrical, Instrumentation - AWWRF Flow Diversion Pump Station	15	\$3,913,167	5	\$1,304,389	\$2,608,778
Additional pump at Pasadena PS	15	134,847	5	44,949	89,898
<b>Total</b>		\$4,048,015		\$1,349,338	\$2,698,676

<sup>a</sup>The costs in 2010 \$ were as follows:

AWWRF - Reject Water Pump Station - Mechanical, Electrical, Instrumentation	\$167,262
AWWRF - Diversion to SWWRF Pump Station - Mechanical, Electrical, Instrumentation	\$1,776,536
AWWRF - Diversion to SWWRF & NWWRF Pump Station - Mechanical, Electrical, Instrumentation	\$2,636,007
AWWRF Diversion to SWWRF & NWWRF - Pasadena Pump	\$90,837

<sup>b</sup>Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>c</sup>Salvage value equals cost less depreciation.

Appendix C - Table 5-4 AWWRF Operational - Renewal & Replacement (CIP) Cost Summary

Alternative with 2.5% Inflation/4% Discount Rate

Item #	AWWRF Capital/Rehab Items	No. Cycles	2010 \$ <sup>a</sup>	Cycle 1 R&R Year <sup>b</sup>	Cycle 1 R&R Cost <sup>c</sup>	Cycle 2 R&R Year <sup>b</sup>	Cycle 2 R&R Cost <sup>c</sup>	Cycle 3 R&R Year <sup>b</sup>	Cycle 3 R&R Cost <sup>c</sup>
1	Admin Building Rehab	1	\$300,000	2013	\$323,067				
1	Admin Building Rehab	1	\$3,000,000	2014	\$3,311,439				
2	Aeration - Aerator Gear Box Rebuild (6 - 3 @ a time)	3	65,000	2011	66,625	2019	\$81,176	2027	\$98,905
3	Aeration - Aerator Gear Box Rebuild (6 - 3 @ a time)	3	65,000	2013	69,998	2021	\$85,286	2029	103,912
4	Aeration - New Aerator Gear Box (2 @ a time)	2	120,000	2011	123,000	2026	\$178,141		
5	Biosolids Dewatering Replacement	2	150,000	2014	165,572	2029	\$239,798		
5	Biosolids Dewatering Replacement	2	3,000,000	2015	3,394,225	2030	\$4,915,849		
6	CCC Expansion	1	100,000	2012	105,063				
6	CCC Expansion	1	850,000	2013	915,357				
7	Clarifier #1 & #2 Modification	1	2,600,000	2022	3,496,711				
8	Clarifier #3 & #4 Modification	1	2,600,000	2022	3,496,711				
9	Digester Cover Replacement	1	750,000	2012	787,969				
9	Digester Cover Replacement	1	1,750,000	2013	1,884,559				
10	Digester Mixer Replacement (3)	2	300,000	2011	307,500	2026	445,352		
11	Digester Mixer Replacement (3)	2	300,000	2012	315,188	2027	456,485		
12	Digester Mixer Replacement (3)	2	300,000	2013	323,067	2028	467,898		
13	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2011	123,000	2021	157,450		
14	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2012	126,075	2022	161,387		
15	Filter Rebuild/Rehab (6 - 2 @ a time)	2	120,000	2013	129,227	2023	165,421		
16	Final Distribution Pump Replacement (4)	2	80,000	2011	82,000	2026	118,760		
17	Final Distribution Pump Replacement (4)	2	80,000	2012	84,050	2027	121,729		
18	Final Distribution Pump Replacement (4)	2	80,000	2013	86,151	2028	124,773		
19	Final Distribution Pump Replacement (4)	2	80,000	2014	88,305	2029	127,892		
20	GBT Replacement	1	1,000,000	2017	1,188,686				
20	Generator Addition	2	150,000	2011	153,750	2026	222,676		
21	Generator Addition	2	1,500,000	2012	1,575,938	2027	2,282,427		
22	Headworks - Rebuild Fine Barscreens #1 & #2	2	200,000	2013	215,378	2028	311,932		
23	Headworks - Rebuild Fine Barscreens #1 & #2	2	200,000	2014	220,763	2029	319,730		
24	Headworks Rehab - Structure	1	300,000	2012	315,188				
25	Influent Pumping Station with Lift Station Mods	1	8,592,000	2011	8,806,800				
26	Influent Pump & VFD Replacement (4 - 2 @ a time)	2	130,000	2011	133,250	2026	192,986		
27	Influent Pump & VFD Replacement (4 - 2 @ a time)	2	130,000	2012	136,581	2027	197,810		
28	In-Plant Lift Station	1	250,000	2011	256,250				
29	Low head Pump/Motor Replacement (4)	2	60,000	2011	61,500	2026	89,070		
30	Low head Pump/Motor Replacement (4)	2	60,000	2012	63,038	2027	91,297		
31	Low head Pump/Motor Replacement (4)	2	60,000	2013	64,613	2028	93,580		
32	Low head Pump/Motor Replacement (4)	2	60,000	2014	66,229	2029	95,919		
33	Solids - New GBT	2	1,500,000	2013	1,615,336	2028	2,339,488		
34	Polymer Unit Replacement	2	150,000	2011	153,750	2026	222,676		
35	Process Equipment Replacement	2	310,000	2011	317,750	2026	460,197		
36	Process Equipment Replacement	2	580,000	2012	609,363	2027	882,539		
37	Process Equipment Replacement	2	570,000	2013	613,828	2028	889,005		
38	Process Equipment Replacement	2	300,000	2014	331,144	2029	479,595		
39	Process Equipment Replacement	2	460,000	2015	520,448	2030	753,764		
40	Return Sludge Replacement (2)	2	60,000	2011	61,500	2026	89,070		
41	Return Sludge Replacement (2)	2	60,000	2012	63,038	2027	91,297		
42	SCADA Phase 2	2	250,000	2011	256,250	2026	371,126		
43	Side Stream Lift Station	1	500,000	2011	512,500				
44	Waste Sludge Pump Replacement	2	100,000	2011	102,500	2026	148,451		
	<b>Totals</b>		<b>\$34,462,000</b>		<b>\$38,220,225</b>		<b>\$18,472,032</b>		<b>\$202,817</b>

<sup>a</sup>The costs for the initial replacement is presented in 2010 \$.

<sup>b</sup>This is the actual year of replacement for each cycle.

<sup>c</sup>The costs for each item are inflated to the year of replacement for each cycle.

Appendix C - Table 5-5 AWWRF - Renewal & Replacement Cost Salvage Value  
Alternative with 2.5% Inflation/4% Discount Rate

Item Numbers <sup>a</sup>	Useful Life <sup>b</sup>	Last Installation Year <sup>c</sup>	Cost in Year XXXX <sup>d</sup>	Expired Study Period Years (Dec. 2030 - Jan. XXXX) <sup>e</sup>	Accumulated Depreciation <sup>f</sup>	Salvage Value <sup>g</sup>
Items #2	8	2027	98,905	4	49,453	49,453
Items #3	8	2029	103,912	2	25,978	77,934
Items #13	10	2021	157,450	10	157,450	-
Items #14	10	2022	161,387	9	145,248	16,139
Items #15	10	2023	165,421	8	132,337	33,084
Items #20	15	2017	1,188,686	14	1,109,440	79,246
Items #7, 8	15	2022	6,993,422	9	4,196,053	2,797,369
Items #4, 10, 16, 20, 26, 29, 34, 35, 40, 42, 44	15	2026	2,538,505	5	846,168	1,692,336
Items #11, 17, 21, 27, 30, 36, 41	15	2027	4,123,585	4	1,099,623	3,023,963
Items #12, 18, 22, 31, 33, 37	15	2028	4,226,675	3	845,335	3,381,340
Items #19, 23, 32, 38	15	2029	1,023,136	2	136,418	886,718
Items #5, 39	15	2030	5,909,410	1	393,961	5,515,450
Items #25, 28, 43	20	2011	9,575,550	20	9,575,550	-
Items #24	20	2012	315,188	19	299,428	15,759
Items #9	20	2013	2,672,527	18	2,405,275	267,253
Items #1	20	2014	3,634,506	17	3,089,330	545,176
Items #6	40	2013	1,020,420	18	459,189	561,231
<b>Totals</b>			<b>\$43,908,685</b>		<b>\$24,966,236</b>	<b>\$18,942,450</b>

<sup>a</sup>The item numbers identify the costs from Table 5-4.

<sup>b</sup>The useful life was provided by City staff.

<sup>c</sup>The last installation year equals the year in which there is a remaining useful life.

<sup>d</sup>The cost in this column equals the cost in the year of replacement for the last installation year for that item.

<sup>e</sup>The expired study period years equals Dec. 2030 less the last installation year.

<sup>f</sup>Depreciation equals the cost divided by the useful life multiplied by the expired study period years.

<sup>g</sup>Salvage value equals cost less depreciation.

**Table 5-6 Operation & Maintenance Costs****Alternative with 2.5% Inflation/4% Discount Rate**

	<b>Annual Escalation Rate</b>	<b>2010 \$</b>	<b>2011 \$</b>
<b>AWWRF Operational</b>			
Existing O&M Costs <sup>a</sup>	2.50%	\$3,179,264	\$3,258,746
Electricity - Reject Water Pumping <sup>b</sup>	2.50%	8,491	8,703
Maintenance - Reject Water Pumping <sup>c</sup>	2.50%	26,000	26,650
<b>Total Annual O&amp;M - AWWRF</b>		<b>\$3,213,755</b>	<b>\$3,294,099</b>
One Time Cost -Rehab - Reject Water Pumps (2)(costs in 2010 & 2019 \$) <sup>d</sup>	2.50%	<b>\$20,000</b>	<b>\$24,977</b>
<b>AWWRF DIVERSION TO SWWRF</b>			
Electricity - AWWRF Pump Station <sup>b</sup>	2.50%	\$127,364	\$130,548
Odor Control & Maintenance - AWWRF Pump Station <sup>e</sup>	2.50%	74,020	75,871
Increased O&M Costs - SWWRF <sup>f</sup>	2.50%	1,360,542	1,394,555
Land Lease Costs <sup>g</sup>	2.50%	92,112	94,415
<b>Total Annual O&amp;M - Diversion to SWWRF</b>		<b>\$1,654,038</b>	<b>\$1,695,389</b>
One Time Cost -Rehab Diversion Pumps (3)(costs in 2010 & 2019 \$) <sup>d</sup>	2.50%	<b>\$30,000</b>	<b>\$37,466</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>			
Electricity - AWWRF Pump Station <sup>b</sup>	2.50%	\$131,543	\$134,832
Odor Control & Maintenance - AWWRF Pump Station <sup>e</sup>	2.50%	74,020	75,871
Electricity - Pasadena Pump Station <sup>b</sup>	2.50%	25,041	25,667
Increased O&M Costs - SWWRF and NWWRF <sup>f</sup>	2.50%	1,354,943	1,388,817
Land Lease Costs <sup>g</sup>	2.50%	92,112	94,415
<b>Total Annual O&amp;M - Diversion to SWWRF &amp; NWWRF</b>		<b>\$1,677,660</b>	<b>\$1,719,601</b>
One Time Cost -Rehab Diversion Pumps (3)(costs in 2010 & 2019 \$) <sup>d</sup>	2.50%	<b>\$30,000</b>	<b>\$37,466</b>
in 2010 & 2019 \$) <sup>d</sup>	2.50%	<b>\$10,000</b>	<b>\$12,489</b>

<sup>a</sup>The existing O&M costs for AWWRF equal the FY2009 costs increased by 3% inflation annually.

<sup>b</sup>FY2009 costs at various pump stations were used to estimate the electrical costs for the new pumping requirements.

<sup>c</sup>Based on 1/2 of a 2 person crew at 10 hours each/week. A loaded rate of \$50/hour was used.

<sup>d</sup>Pump rehab costs were estimated at \$10,000 each, inflated at 3% annually to 2019.

<sup>e</sup>Odor control and maintenance based on existing pump station costs, with a 2 person crew working 10 hours/wk each at a \$50/hour loaded rate.

<sup>f</sup>Electrical, chemical, sludge costs were based on actual FY2009 costs adjusted for the quantity of flow diverted.

Personnel costs were estimated, based on new staffing requirements.

<sup>g</sup>Land lease costs are estimated to equal 1/2 of the existing cost.

**Appendix C - Table 5-7 AWWRF Operational - Present Worth New Capital Costs and Salvage Value  
Alternative with 2.5% Inflation/4% Discount Rate**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF Operational</b>			
Land Costs	\$4,900,000	1.0000	\$4,900,000
Capital Costs	9,795,413	1.0000	9,795,413
Demolition Costs	-		-
<b>Subtotal Capital Costs</b>	<b>\$14,695,413</b>		<b>\$14,695,413</b>
Salvage Value of Capital Cost Table 6-2	(9,770,202)	0.4564	(4,458,993)
<b>AWWRF Operational - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$4,925,210</b>		<b>\$10,236,420</b>

<sup>a</sup>Taken from Table 5-2.

<sup>b</sup>Present worth equals the capital costs times the present worth factor.

<sup>c</sup>Equals capital costs less the salvage value.

**Appendix C - Table 5-8 SWWRF Diversion - Present Worth New Capital Costs and Salvage Value  
Alternative with 2.5% Inflation/4% Discount Rate**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF DIVERSION TO SWWRF</b>			
Land Costs	-	1.0000	-
Capital Costs	\$30,302,075	1.0000	\$30,302,075
Demolition Costs	3,536,250	1.0000	3,536,250
<b>Subtotal Option 1 Capital Costs</b>	<b>\$33,838,325</b>		<b>\$33,838,325</b>
Salvage Value of Capital Cost Table 6-2	(13,396,465)	0.4564	(6,113,972)
<b>AWWRF Diversion to SWWRF - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$20,441,860</b>		<b>\$27,724,353</b>

<sup>a</sup>Taken from Table 5-2.

<sup>b</sup>Present worth equals the capital costs times the present worth factor.

<sup>c</sup>Equals capital costs less the salvage value.

**Appendix C - Table 5-9 SWWRF & NWWRF Diversion - Present Worth New Capital Costs and Salvage Value  
Alternative with 2.5% Inflation/4% Discount Rate**

	Capital Costs 2011 \$ <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>			
Land Costs	-	1.0000	-
Capital Costs	\$38,269,400	1.0000	\$38,269,400
Demolition Costs	3,536,250	1.0000	3,536,250
<b>Subtotal Option 2 Capital Costs</b>	<b>\$41,805,650</b>		<b>\$41,805,650</b>
Salvage Value of Capital Cost Table 6-2	(16,712,910)	0.4564	(7,627,554)
<b>AWWRF Diversion to SWWRF &amp; NWWRF - Capital Costs Net of Salvage Value<sup>c</sup></b>	<b>\$25,092,740</b>		<b>\$34,178,096</b>

<sup>a</sup>Taken from Table 5-2.

<sup>b</sup>Present worth equals the capital costs times the present worth factor.

<sup>c</sup>Equals capital costs less the salvage value.

**Appendix C - Table 5-10 AWWRF Operational - Present Worth of Replacement & Rehabilitation and Salvage Value Alternative with 2.5% Inflation/4% Discount Rate**

	Replacement Year	Table 5-4 Replacement Costs <sup>a</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>AWWRF Operational</b>				
Items Replaced in 2011	2011	11,517,925	0.9381	10,804,808
Items Replaced in 2012	2012	4,181,488	0.8800	3,679,734
Items Replaced in 2013	2013	6,240,581	0.8255	5,151,734
Items Replaced in 2014	2014	4,183,451	0.7744	3,239,708
Items Replaced in 2015	2015	3,914,672	0.7265	2,843,868
Items Replaced in 2017	2017	1,188,686	0.6393	759,918
Items Replaced in 2019	2019	81,176	0.5626	45,668
Items Replaced in 2021	2021	242,736	0.4951	120,172
Items Replaced in 2022	2022	7,154,809	0.4644	3,322,856
Items Replaced in 2023	2023	165,421	0.4357	72,069
Items Replaced in 2026	2026	2,538,505	0.3597	912,983
Items Replaced in 2027	2027	4,222,491	0.3374	1,424,611
Items Replaced in 2028	2028	4,226,675	0.3165	1,337,732
Items Replaced in 2029	2029	1,366,846	0.2969	405,819
Items Replaced in 2030	2030	5,669,613	0.2785	1,579,099
<b>Subtotal Replacement Cost Value</b>		<b>\$56,895,074</b>		<b>\$35,700,779</b>
	Replacement Year	Table 5-3 Replacement Costs <sup>c</sup>	Present Worth Factor	Present Worth <sup>b</sup>
R&R New Pumps and Meters	2026	248,302	0.3597	89,303
<b>Subtotal Replacement Cost Value</b>		<b>\$248,302</b>		<b>\$89,303</b>
	Replacement Year	Table 5-3 Salvage Value <sup>c</sup>	Present Worth Factor	Present Worth <sup>b</sup>
R&R New Pumps and Meters	2026	(\$165,535)	0.2785	(\$46,105)
<b>Subtotal Salvage Cost Value</b>		<b>(\$165,535)</b>		<b>(\$46,105)</b>
	Last Replacement Year	Table 5-5 Salvage Value <sup>d</sup>	Present Worth Factor	Present Worth <sup>b</sup>
<b>Subtotal Salvage Cost Value</b>		<b>(18,942,450)</b>	<b>0.2785</b>	<b>(\$5,275,845)</b>
<b>AWWRF Operational - Total Replacement &amp; Salvage Cost Value<sup>e</sup></b>		<b>\$38,035,391</b>		<b>\$30,468,131</b>

<sup>a</sup>Taken from Table 5-4, with amounts equal to Cycle 1, 2 and 3 costs arranged by year of replacement.

<sup>b</sup>Present worth equals the replacement cost or salvage value times the present worth factor.

<sup>c</sup>Replacement costs and Salvage Value taken from Table 5-3.

<sup>d</sup>Salvage value equals the total from Table 6-5 multiplied by the present worth factor in 2030.

<sup>e</sup>The totals equal the replacement costs and replacement cost present worth plus the salvage value and salvage value present worth.

**Appendix C - Table 5-11 AWWRF Diversions - Present Worth of Replacement & Rehabilitation and Salvage Value Alternative with 2.5% Inflation/4% Discount Rate**

<b>AWWRF DIVERSION TO SWWRF</b>	<b>Replacement Year</b>	<b>Table 5-3 Replacement Costs<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	\$2,637,278	0.3597	\$948,507
<b>Total Replacement Cost Value</b>		<b>\$2,637,278</b>		<b>\$948,507</b>
	<b>Replacement Year</b>	<b>Table 5-3 Salvage Value<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R New Pumps and Meters	2026	(\$1,758,185)	0.2785	(\$489,689)
<b>Total Replacement &amp; Salvage Cost Value AWWRF Diversion to SWWRF<sup>c</sup></b>		<b>\$879,093</b>		<b>\$458,818</b>
<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>	<b>Replacement Year</b>	<b>Table 5-3 Replacement Costs<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
AWWRF R&R New Pumps and Meters	2026	\$3,913,167	0.3597	\$1,407,386
Additional pump at Pasadena PS	2026	134,847	0.3597	48,498
<b>Total Replacement Cost Value</b>		<b>\$4,048,015</b>		<b>\$1,455,884</b>
	<b>Replacement Year</b>	<b>Table 5-3 Salvage Value<sup>a</sup></b>	<b>Present Worth Factor</b>	<b>Present Worth<sup>b</sup></b>
R&R Costs for New Pumps & Motors	2026	(\$2,608,778)	0.2785	(\$726,596)
R&R Costs for Pasadena Pumps & Motors	2026	(89,898)	0.2785	(\$25,038)
<b>Subtotal Salvage Cost Value</b>		<b>(\$2,698,676)</b>		<b>(\$751,635)</b>
<b>Total Replacement &amp; Salvage Cost Value AWWRF Diversion to SWWRF &amp; NWWRF<sup>c</sup></b>		<b>\$1,349,338</b>		<b>\$704,250</b>

<sup>a</sup>Replacement costs and Salvage Value taken from Table 5-3.

<sup>b</sup>Present worth equals the replacement cost or salvage value times the present worth factor.

<sup>c</sup>The totals equal the replacement costs and replacement cost present worth plus the salvage value and salvage value present

**Appendix C - Table 5-12 AWWRF Operational - Present Worth of Operation and Maintenance Costs  
Alternative with 2.5% Inflation/4% Discount Rate**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 3% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
<b>AWWRF Operational</b>					
Existing O&M Costs	\$3,258,746	25.5447	\$83,243,544		\$46,058,915
Electricity - Reject Water Pumping	8,703	25.5447	222,321		123,011
Maintenance - Reject Water Pumping	26,650	25.5447	680,765		376,669
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$3,294,099</b>		<b>\$84,146,630</b>		
Rehab - Reject Water Pumps (2019 \$)	\$24,977	1.0000	\$24,977	0.5626	14,052
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Operational</b>					<b>\$46,572,647</b>

<sup>a</sup>O&M costs taken from Table 5-6.

<sup>b</sup>Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup>Present worth is the accumulation of the O&M costs from 2011 through 2030 times the present worth factor for each year.

**Appendix C - Table 5-13 AWWRF Diversion to SWWRF - Present Worth of Operation and Maintenance  
Alternative with 2.5% Inflation/4% Discount Rate**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 3% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
Electricity - AWWRF Pump Station	\$130,548	25.5447	\$3,334,811		\$1,845,161
Odor Control & Maintenance - AWWRF Pump Station	75,871	25.5447	1,938,086		1,072,349
Increased O&M Costs at SWWRF	1,394,555	25.5447	35,623,441		19,710,562
Land Lease Costs	94,415	25.5447	2,411,794		1,334,453
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$1,695,389</b>		<b>\$43,308,131</b>		
Rehab - Diversion Pumps (2019 \$)	\$37,466	1.0000	\$37,466	0.5626	21,078
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Diversion to SWWRF</b>					<b>\$23,983,603</b>

<sup>a</sup>O&M costs taken from Table 5-6.

<sup>b</sup>Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup>Present worth is the accumulation of the O&M costs from 2011 through 2030 times the present worth factor for each year.

**Appendix C - Table 5-14 AWWRF Diversion to SWWRF & NWWRF - Present Worth of Operation and Maintenance  
Alternative with 2.5% Inflation/4% Discount Rate**

	Table 5-6 Operation and Maintenance Costs 2011 \$ <sup>a</sup>	Compounding Factor at 3% Inflation	Cumulative Operation and Maintenance Costs <sup>b</sup>	Present Worth Factors	Present Worth <sup>c</sup>
Electricity - AWWRF Pump Station	\$134,832	25.5447	\$3,444,231		\$1,905,704
Odor Control & Maintenance - AWWRF Pump Station	75,871	25.5447	1,938,086		1,072,349
Electricity - Pasadena Pump Station	25,667	25.5447	655,661		362,779
Increased Marginal Costs	1,388,817	25.5447	35,476,854		19,629,455
Land Lease Costs	94,415	25.5447	2,411,794		1,334,453
<b>Subtotal - Annual &amp; Cumulative O&amp;M Costs</b>	<b>\$1,719,601</b>		<b>\$43,926,626</b>		
Rehab - Diversion Pumps (2019 \$)	\$37,466	1.0000	\$37,466	0.5626	21,078
Rehab - Pasadena Pump (2019 \$)	\$12,489	1.0000	\$12,489	0.5626	7,026
<b>Present Worth Operation &amp; Maintenance Costs - AWWRF Diversion to SWWRF &amp; NWWRF</b>					<b>\$24,332,844</b>

<sup>a</sup>O&M costs taken from Table 5-6.

<sup>b</sup>Equals the costs from Table 5-6 times the compounding factor.

<sup>c</sup>Present worth is the accumulation of the O&M costs from 2010 through 2030 times the present worth factor for each year.

**Appendix C - Table 5-15 Present Worth Summary - Inflation 2.5%, Discount 4%**  
**Alternative with 2.5% Inflation/4% Discount Rate**

	<b>AWWRF OPERATIONAL - Present Worth for Study Period</b>	<b>AWWRF DIVERSION TO SWWRF Present Worth for Study Period</b>	<b>AWWRF DIVERSION TO SWWRF AND NWWRF Present Worth for Study Period</b>
Capital Costs			
New Capital Costs - Net of Salvage Value <sup>a</sup>	\$10,236,420	\$27,724,353	\$34,178,096
Replacement (CIP) Costs Net of Salvage Value <sup>b</sup>	30,468,131	458,818	704,250
Operation & Maintenance Costs <sup>c</sup>	46,572,647	23,983,603	24,332,844
<b>Total Present Worth Option 1</b>	<b>\$87,277,198</b>	<b>\$52,166,774</b>	<b>\$59,215,190</b>

<sup>a</sup>Taken from Tables 5-7, 5-8, 5-9.

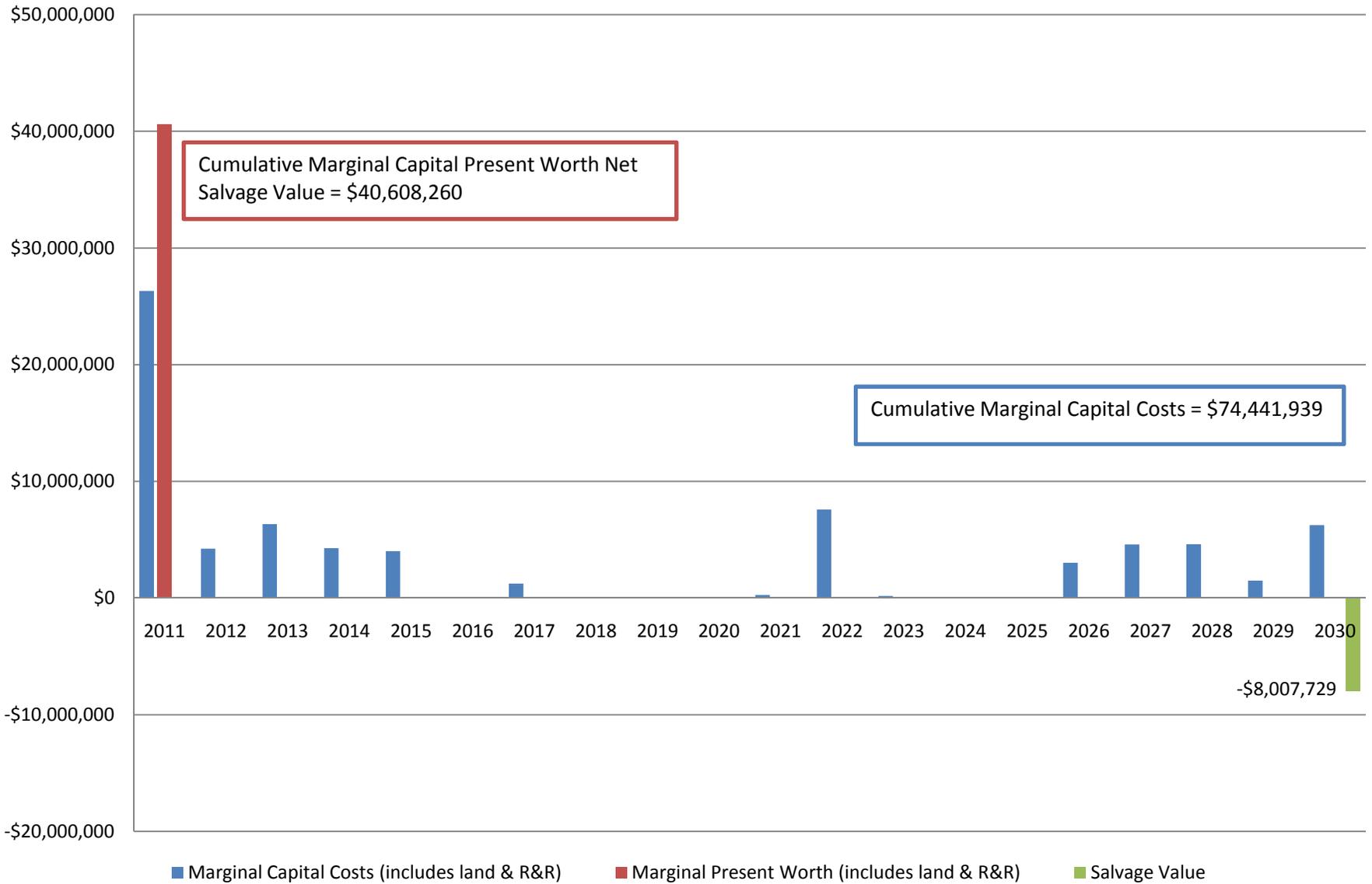
<sup>b</sup>Taken from Tables 5-10, 5-11.

<sup>c</sup>Taken from Tables 5-12, 5-13, 5-14.

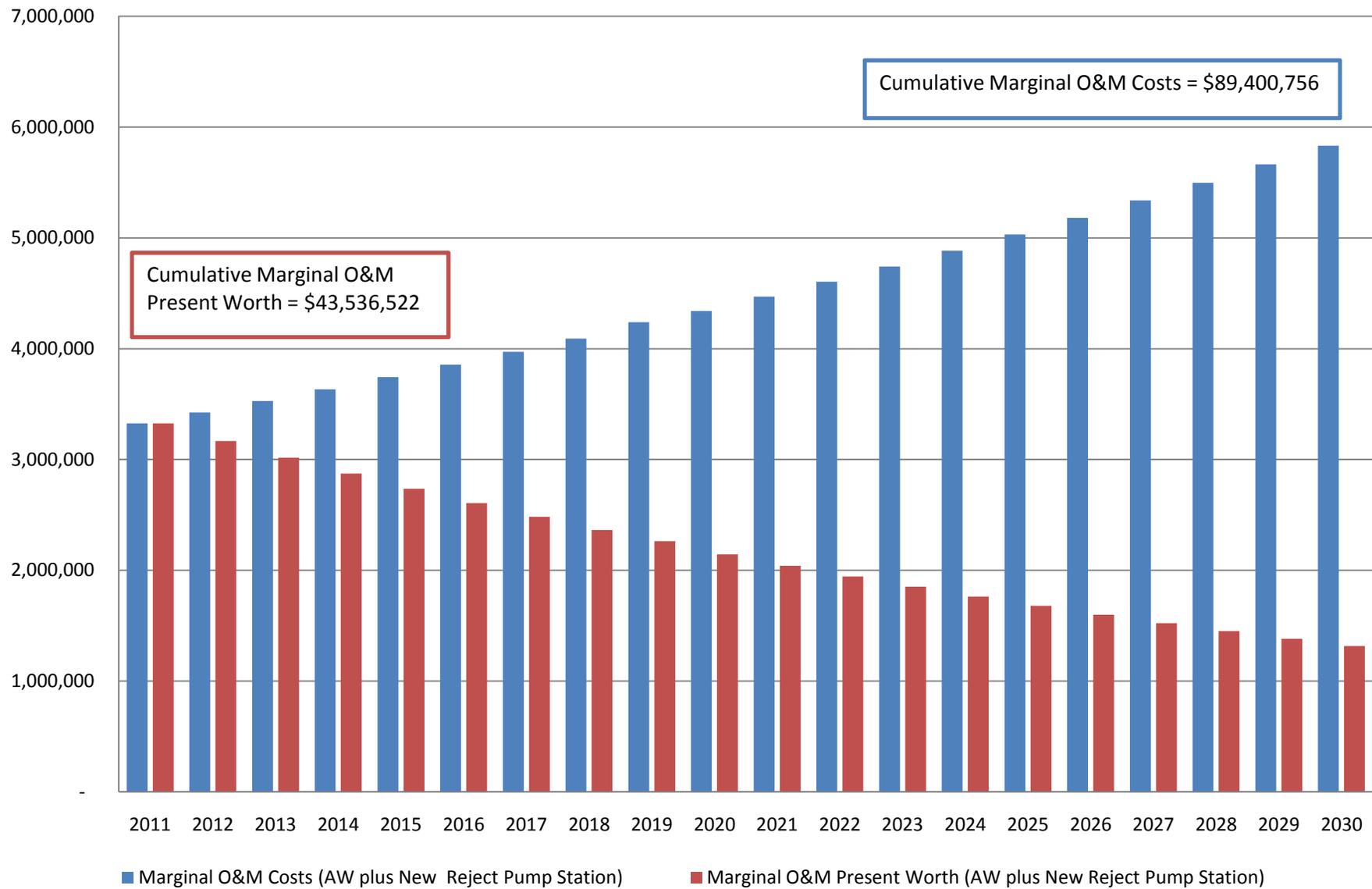
**Appendix C - Table 5-16 AWWRF and Diversions Annual Cash Flow  
Alternative with 2.5% Inflation/4% Discount Rate**

	<b>AWWRF Operational</b>	<b>AWWRF DIVERSION TO SWWRF</b>	<b>AWWRF DIVERSION TO SWWRF AND NWWRF</b>
Capital Costs - New			
New Capital Costs - 2011 \$	\$9,795,413	\$30,302,075	\$38,269,400
Land	4,900,000		
Demolition Costs	-	3,536,250	3,536,250
Capital Costs - Replacement (CIP)			
'2011	11,237,000.00		
'2012	3,980,000.00		
'2013	5,795,000.00		
'2014	3,790,000.00		
'2015	3,460,000.00		
<b>Total</b>	<b>\$42,957,413</b>	<b>\$33,838,325</b>	<b>\$41,805,650</b>
Annual Debt Service (5%,20 yrs.)	\$3,447,014	\$2,715,275	\$3,354,594
Change in O&M Costs	\$35,353	<b>(\$1,579,253)</b>	<b>(\$1,555,041)</b>
Annual Cash Increase (Decrease)	\$3,482,367	\$1,136,022	\$1,799,553
Annual Savings from Diversion		\$2,346,345	\$1,682,814

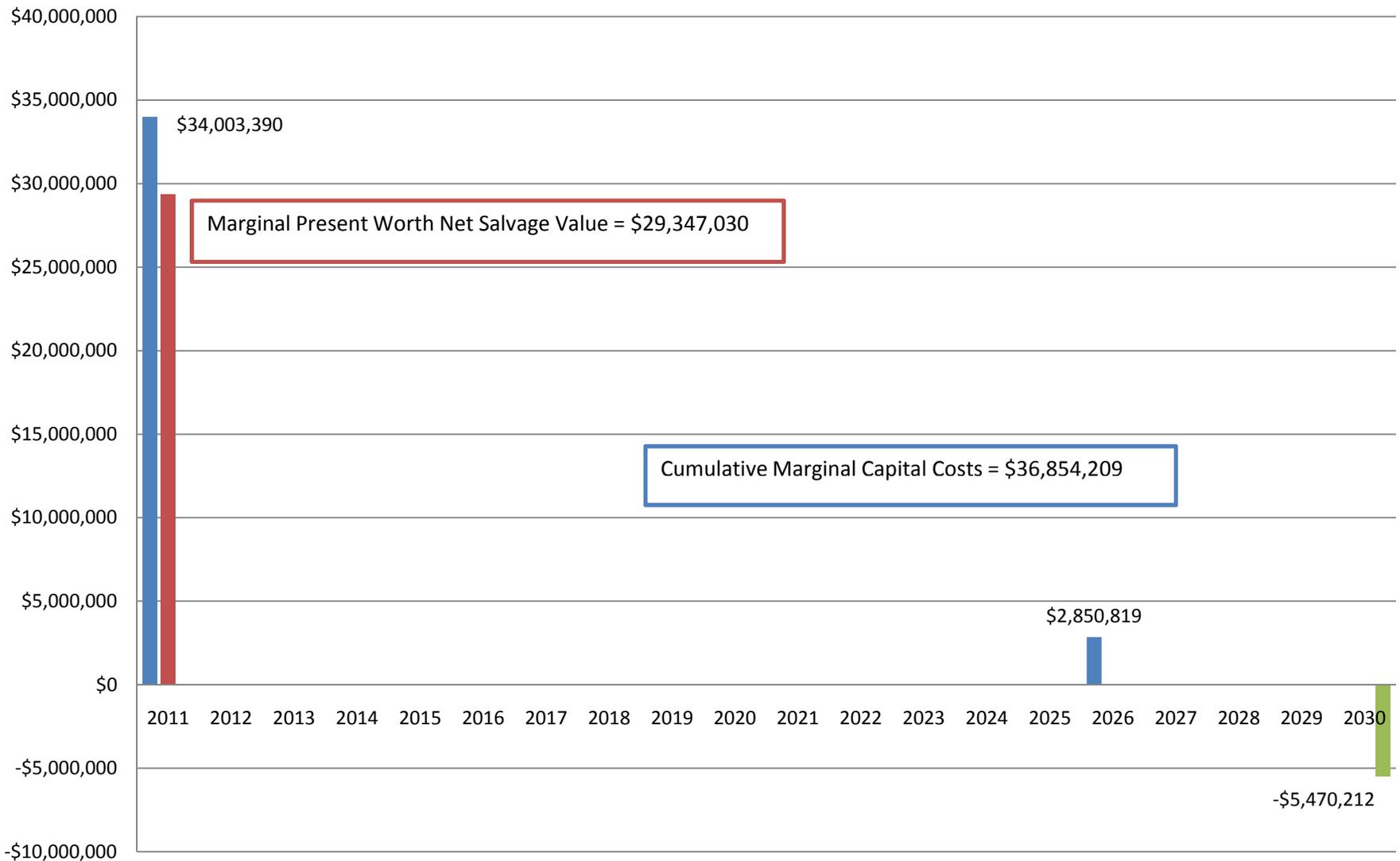
## Keep AWWRF - Marginal Capital Costs with Land and Rehabilitation and Replacement (R&R)



## Keep AWWRF - Marginal Annual Operations and Maintenance (O&M) Costs

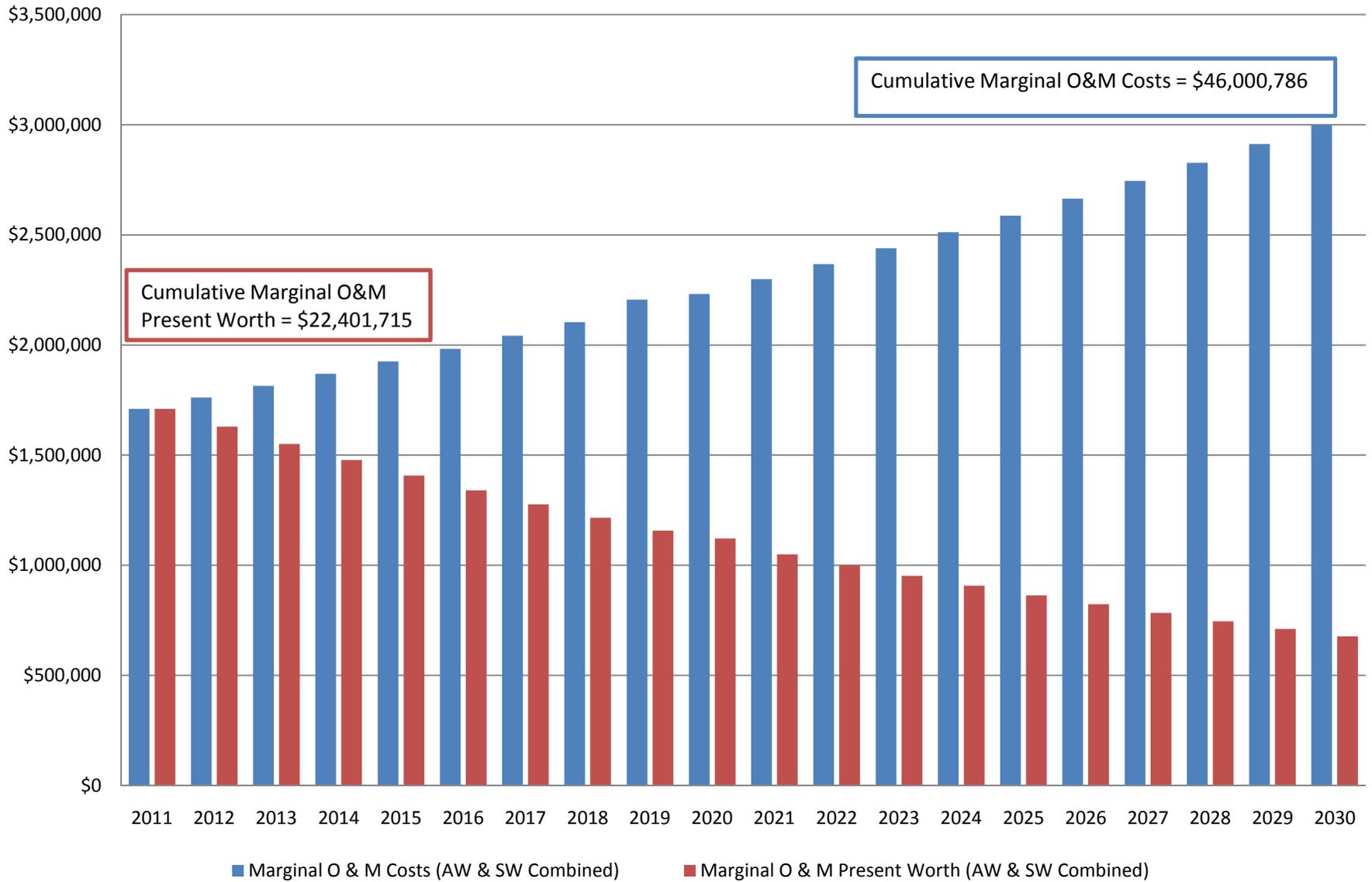


## SWWRF Only Flow Diversion - Marginal Capital Costs with Rehabilitation and Replacement (R&R)

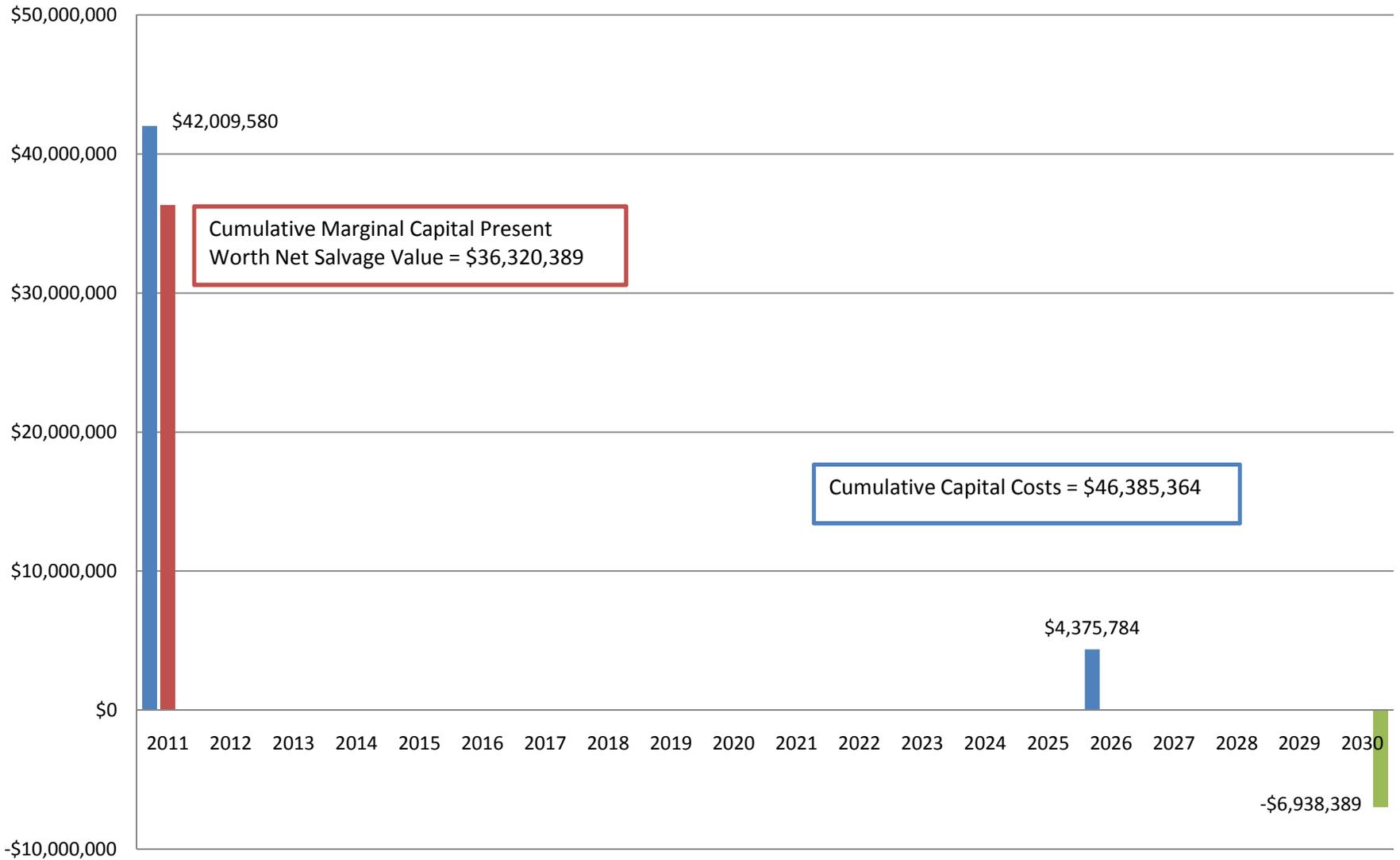


■ Marginal Capital Costs (SW New Capital & R&R and AW Demolition) ■ Marginal Present Worth (SW Diversion) ■ Salvage Value - (SW Diversion)

## SWWRF Only Flow Diversion - Marginal Annual Operations and Maintenance (O&M) Costs



## SWWRF & NWWRF Flow Diversion - Marginal Capital Costs with Rehabilitation and Replacement (R&R)



■ Marginal Capital Costs SW & NW New Capital & R&R and AW Demolition)
 ■ Marginal Present Worth of Capital Costs
 ■ Salvage Value

## SWWRF & NWWRF Flow Diversion - Marginal Annual Operations and Maintenance (O&M) Costs

