WATER SYSTEM CAPITAL IMPROVEMENT PROGRAM

Prepared for:

Joshua Basin Water District
61750 Chollita Road
Joshua Tree, California 92252
Contact: Curt Sauer, General Manager

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Michael Metts, PE

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ACKNOWLEDGMENTS

The Capital Improvement Plan for the Joshua Basin Water District (District) Water System is the result of the combined efforts of the District management and staff and the Dudek team. This partnership has resulted in a comprehensive evaluation of the water system, and establishes a framework for long-term planning to ensure sustainable, high-quality service to the District's customers. In particular, the efforts of the following individuals are acknowledged and greatly appreciated:

Joshua Basin Water District

Curt Sauer .... General Manager
Susan Greer .... Assistant General Manager
Seth Zielke .... Director of Water Resources and Operations
Randy Little .... Water Facilities Manager
Jim Corbin .... Water Distribution Manager
Randy Mayes .... Senior Administrative Assistant
Keith Faul .... GIS Coordinator

Dudek Team

Michael Metts, PE .... District Engineer / Project Manager
Kate Palmer, PE .... Senior Engineer
Justin Scheidel, PE .... Senior Engineer
Servando Diaz, EIT .... Project Engineer
Hanna Dodd .... Project Engineer

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1 INTRODUCTION

1.1 Background

The Joshua Basin Water District (District) is located in the southern portion of San Bernardino County, approximately seven miles east of Yucca Valley, and 14 miles west of Twenty-nine Palms. The District encompasses an area of approximately 96 square miles, and serves the unincorporated area of Joshua Tree, California. Historically, the District has served the water supply needs of its constituency, with wastewater disposal accomplished through the exclusive use of on-site septic systems.

The District relies totally on local groundwater for its drinking water supply, encompassing two subbasins of the greater Morongo Groundwater Basin, including the Joshua Tree and Copper Mountain Subbasins. The District maintains approximately 5,800 water connections within its service area. With an average annual rainfall of approximately 4.5 inches, protection of its groundwater quality is a primary District objective.

Joshua Basin Water District

A locally-formed government agency whose customers are the "Rate Payers," regulated by the State Water Code and governed by publicly elected five-member Board of Directors. District operations include field, office, engineering, and managerial staff, managed by a General Manager who is appointed by the Board.

JBWD Mission

Joshua Basin Water District has expressed that its mission is to provide a high standard of water quality and customer service at responsible cost; to protect the water resources of Joshua Basin Water District; to promote cooperation and respect with customers, employees, neighboring communities and public – private agencies.

1.2 Purpose

The purpose of the District's Water System Capital Improvement Program (CIP) is to develop long-range infrastructure planning and budgeting for the entire water supply and distribution system. The CIP is intended to ensure continued high-quality service to the District water customers. The CIP is aligned with the District's Mission (see inset, right) and will support long-term financial planning, including future water rate adjustments.

1.3 Methodology

The District was formed in 1963. The District purchased and combined several smaller existing water systems to define the current service area. The District finances, constructs, operates and maintains the water system to serve properties within its service area boundaries. Much of the infrastructure was built by the respective prior agencies and acquired by the District during District formation. Aside from record drawings, very little facility planning documentation exists for the system. Because the service area is fully defined and limited growth has occurred in recent years, the District has not been required to prepare service expansion or recent capacity analyses for the water system. Development of this CIP makes use of available information, site visits and discussions with existing operations staff to define the needed improvements. As a long-range planning tool, the CIP is intended to facilitate sustainable operations and capital reinvestment.

1.3.1 Capital Improvement Project Definition

Development of the CIP is predicated on defining the various water facilities that comprise the system, including water tanks, booster pump stations, wells, distribution pipelines, appurtenances and other District capital assets. The Governmental Accounting Standards Board (GASB) Statement No. 34, *Basic Financial Statements – and Management's Discussion and Analysis – for State and Local Governments*, Paragraph 19, provide the following definition of capital assets:

> "The term *capital assets* include land, improvements to land, easements, buildings, building improvements, vehicles, machinery, equipment, works of art and historical treasures, infrastructure, and all other tangible or intangible assets that are used in operations and that have initial useful lives extending beyond a single reporting period."

For accounting purposes, if a cost benefits only the current period then it is considered an "expendable" item and categorized as an operating expense, not a capital asset. Conversely, if a cost benefits more than one period, then a portion of that cost can be allocated to each benefitting period (depreciated) and thus forms the basis for a capital asset or "durable" item. For the purposes of defining projects in this CIP, the asset inventory is limited to tangible capital assets (e.g., structures, equipment, infrastructure); excluding land which is inferred to benefit operations indefinitely and therefore is never recognized as an expense. Intangible capital assets (e.g., computer software, water rights, easements) are likewise excluded from this CIP analysis.

Capital Projects, as defined in the CIP, consist of replacement or upgrades to tangible assets with estimated project valuation exceeding $50,000. Capital replacement projects include only replacement of an existing asset, whereas capital improvement may include not only capital replacement, but improvement or upgrade to an existing asset. Upgrades identified through the course of the work that do not meet the criteria of a capital project were either grouped with related facility improvements to form a capital asset or identified as non-capital items. Criteria and examples of capital projects and non-capital projects are presented in Table 1-1.

Table 1-1. Capital vs. Non-Capital Project Criteria

Criteria	Capital Project	Non-Capital Project
Estimated Value	Greater than $50,000	Less than $50,000
Reoccurrence	Greater than 1 year (Durable)	Less than 1 year (Expendable)
Engineering	Specifications Required	No Specifications Required
Procurement	Competitive Bid	Sole Source or Competitive Proposals
Installer	Contractor	District Staff or Contractor
Examples	Major Equipment Replacement Facility or System Upgrade Minor Asset Replacement Programs	Minor Equipment Replacement Routine Maintenance Rehabilitation of Minor Assets

1.3.2 Proposition 218

This CIP supports the District's requirement to set water system fees that are subject to Proposition 218. Proposition 218, the "Right to Vote on Taxes Act" was passed by California voters in November 1996, requiring voter approval prior to imposition or increase of general taxes, assessments, and certain user fees. Water service fees are subject to Proposition 218 regulations which carefully define rules and restricts for benefit assessments. As it applies to water service providers, rates must be tied to the specific benefit realized by the fee payer. Fees charged to property owners may not exceed the cost of providing the service which includes maintaining infrastructure.

The CIP establishes long-term planning budgets for sustainable operation of the District water facilities. The development of the CIP is founded on the concept of maximizing return on capital investments. These budgets support a rate structure that generates revenue necessary to maintain the facilities in operable condition.

1.3.3 Asset Inventory and Condition Assessments

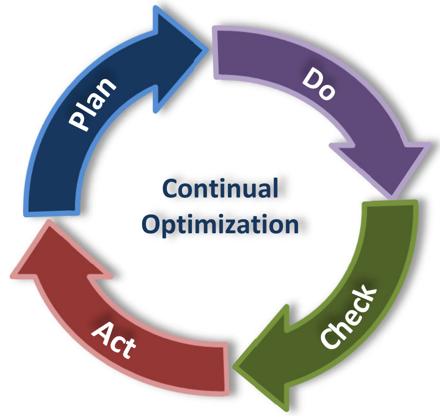
The initial tasks in development of the CIP focus on reviewing the District's existing assets. Review of the District's assets shows that the water system assets include approximately 1,695,500 linear feet (321 miles) of distribution pipeline, 236 air vacuum valves, 149 blow-off assemblies, 1,313 fire hydrants, 13 master meters, 4,418 service meters, 12 pressure reducing stations, and 1,803 in-line valves. In addition to the distribution system facilities, other District facilities include 5 groundwater wells, 32 pumps and motors, 19 storage tanks, 9 standby power generators, 22 vehicles, the main office, the operations shop, and the recharge ponds and its supply pipeline. Table 1-2 summarizes identified District assets.

Table 1-2. Water System Asset Summary

Asset Description	Capital Project
Water Pipelines (4- through 20-inch)	321 miles
Air Vacuum Valves	236
Blow-Off Assemblies	149
Fire Hydrants	1,313
Master Meters	13
Service Meters	4,418
Pressure Reducing Stations	12
In-Line Isolation Valves	1,803
Water Pumps & Motors	28
Water Wells	5
Auxiliary Power Units	7
Water Storage Tanks	17
Transportation Work Vehicles	10

1.3.4 Operational Changes

District operations staff regularly evaluates the operations of the water system facilities and adjust operations, as necessary. Many of the identified projects provide for increased efficiency or other operational improvements. Implementing operational changes is most productive when executed in a methodical approach that allows for ongoing performance evaluation and adjustments. The "Plan-Do-Check-Act" approach, also known as the Iterative 4-step "Deming Cycle", is recommended for the execution of proposed operational adjustments. As District staff prepares to implement operational changes, it is recommended that thorough implementation plans be prepared in advance. The implementation plans allow evaluation of performance improvements and include a step-wise approach with monitoring protocols that continuously check process performance against expected outcomes to allow adjustments to be made that effectively produce the anticipated.



1.4 Budgetary Cost Opinions

For each defined project, a budgetary cost opinion is developed in the CIP. Cost opinions are based on anticipated construction cost values with contingency and soft cost multipliers included to define a projected total "project cost". Procedures and guidelines used in the preparation of the opinions of probable construction costs are based on:

- Vendor quotes and published catalog costs for major equipment and mechanical components.
- Multipliers for delivery, in-field services, and installation tools, parts, labor, taxes, and contractor overhead and profit (OH&P) are applied to derive an installed unit cost.
- Parametric unit cost values derived from recent similar projects for demolition, piping, civil work, and electrical work. Scaling factors are applied to adjust for size and complexity.
- Estimates from previously completed projects.
- Unit cost factors developed for specific components of the project, as applicable.
- Project location factors used to normalize costs to the appropriate locale using RS Means.

1.4.1 Cost Indices

In developing project cost opinions, it is customary to use historical data from similar projects (e.g., detailed cost opinions, bids from constructed projects). To maintain relevance with long-term planning horizons, the District must consider the date and geographical region of the cost information. The industry standard barometer of changes in construction market conditions over time is the Engineering News Record's (ENR) Construction Cost Index (CCI). This index is computed from constant quantities of structural steel (weighted 15%), portland cement (2%), lumber (10%), and common labor (73%) in 20 cities, the average of which is considered to be the national average and based on an indexed value of 100 in 1913 (Sanks, 852). Local ENR-CCI indices are also available to provide a more accurate index for local project costs. The Los Angeles ENR-CCI is applicable to District projects. Reference costs in this document are normalized to July 2015 dollars. The Los Angeles ENR-CCI for July 2015 was 10,981. As projects are constructed in the future, the cost opinions in this CIP are to be increased based on the then current Los Angeles ENR-CCI.

1.4.2 Cost Estimate Classifications

The Association for Advancement of Cost Estimating International provides guidelines for cost estimating practices and classification. The *Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries* (AACE International Recommended Practice No. 18R-97) provides guidelines for applying the principles of estimate classification to infrastructure projects, such as those defined in this CIP. A summary of the AACE classification system is presented in Table 1-3. For the development of CIP projects in this document, Class 5 and 4 estimates are used for major assets, depending on the available information.

Table 1-3. Summary of Cost Estimate Classification System

	Primary Characteristic	Secondary Characteristic			
Estimate Class	**Level of Project Definition** Expressed as % of complete definition	**End Usage** Typical purpose of estimate	**Methodology** Typical estimating method	**Expected Accuracy Range [a]** Typical variation in low and high ranges	**Preparation Effort [b]** Typical degree of effort relative to least cost index of 1
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgement or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes:

[a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for a given scope.

[b] If the range index value of "1" represents 0.0005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

Cost opinions classified as Class 5 and Class 4 are defined by AACE International as follows:

Class 5 Cost Opinion as Defined by AACE International
Description: Class 5 estimates are generally prepared based on limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systematic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a limited amount of time and with little effort expended – sometimes requiring less than an hour to prepare. Often, little more than a proposed plant type, location, and capacity are known at the time of estimate preparation.
Estimating Methods Used: Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques.
Expected Accuracy Range: Typical accuracy ranges for Class 5 estimates are -20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.
End Usage: Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.

Class 4 Cost Opinion as Defined by AACE International
Description: Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems, and preliminary engineered process and utility equipment lists.
Estimating Methods Used: Class 4 estimates virtually always use stochastic estimating methods such as equipment factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques.
Expected Accuracy Range: Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.
End Usage: Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.

1.4.3 Contingency

Project contingencies are applied to cover uncertainties in the estimating process, including unknown or unforeseen costs. Industry standard contingencies can range from 10 to 30 percent, depending on the confidence level of the cost opinion (i.e., project stage, risk, scope development, engineering constraints).

Unless noted otherwise, for these alternative analyses, a 20 percent contingency was added to the projected construction cost opinion.

1.4.4 Implementation Costs

Implementation cost allowances (a.k.a. "soft costs") are included in project cost opinions for costs directly associated with delivering projects from planning through construction that are not included in the construction cost opinion (i.e., Planning, Design, Permitting, Construction Management/Inspection, Project Administration, and Commissioning and Closeout). It is recognized that projects with smaller construction costs have a larger percentage of project delivery (soft) costs, while the larger projects have a smaller percentage of soft costs. This adjustment is primarily due to the number of implementation cost tasks that have relatively fixed costs such as contract processing, permit fees, bidding, and other such items. These fixed costs have a greater impact on smaller projects.

Seven of the largest municipalities in California (Cities of Long Beach, Los Angeles, Oakland, Sacramento, San Diego, San Jose, and the City and County of San Francisco) have collaborated to study, over the last 10 years, the actual cost of delivering capital improvement projects. *The California Multi-Agency CIP Benchmarking Study* was first published in 2002 and has been updated yearly to reflect a larger number of projects. The results of this benchmarking study provide insight into soft costs of California projects as a function of project type and size. Of 112 municipal projects (median construction value of $3.32 million) including reservoirs and treatment plants, and 252 pipeline projects (median construction value of $0.86 million), the project implementation or delivery costs averaged 36% to 37% of the construction costs. Table 1-4 presents the project implementation allowances (soft cost) classification system utilized in the CIP development. Each project is assigned soft costs consistent with these classifications and adjusted to represent the anticipated effort for each project depending on the project size and complexity. Adjustments to these soft cost categories are based on District-specific understanding and past work experience.

Table 1-4. Summary of Cost Estimate Classification System

Soft Cost Class	Category	% of Constr. Cost	Comments
A	Engineering CM & ESDC Administration	8% 15% 2%	Projects that are relatively simple (e.g., long pipelines, large pond liners, large (+$300k) equipment replacement) and/or larger (e.g., full treatment plant design), possibly with repetitive aspects.
	Total Soft Costs	25%	
B	Engineering CM & ESDC Administration	10% 18% 3%	Projects of average size and/or complexity (e.g., new pump stations, treatment plant component design, major equipment replacement)
	Total Soft Costs	31%	
C	Engineering CM & ESDC Administration	15% 20% 5%	Complex and/or small projects (e.g., electrical upgrades, SCADA upgrades, small pump station replacement/rehab)
	Total Soft Costs	40%	
D	Engineering CM & ESDC Administration	5% 5% 5%	District replaced/installed equipment (e.g., small pump replacement, instrument replacement projects)
	Total Soft Costs	15%	

Engineering = Study, Preliminary and Final Design
CM = Construction Management (Contract management and inspection)
ESDC = Engineering Services During Construction
Administration = District administrative and legal costs

1.5 Prioritization

Capital improvement projects are prioritized based on discussions with District staff and the available funding for capital projects, projected on an annual basis. The primary drivers of project priority are based on the technical factors of remaining useful life, condition assessment, operations assessment, and the failure and consequence analysis. Prioritization factors are explained further in the following discussions.

1.5.1 Expected Useful Life

The expected useful life of an asset minus the age of the asset provides a remaining useful life value which provides a target date for potential replacement of the asset. For the District, a large number of the existing assets have been in service for more than 30 years. Mechanical equipment is regularly assessed, and rebuilt to maintain an operational system. However, a considerable amount of existing distribution pipeline and mechanical equipment remain in need of replacement or rehabilitation. The expected useful life of the assets are incorporated into the prioritization of the identified projects, as many of the projects have a similar need with respect to useful life considerations. The remaining useful life value provides a target date to replace the asset. Remaining useful life priority scores are applied according to Table 1-5.

Table 1-5. Priority Weighted Scores for Expected Useful Life Remaining

Remaining Useful Life	Priority Weighted Score
0-5 years	25
6-10 years	10
11-20 years	5
20+ years	0

1.5.2 Condition Assessment

The condition of an asset is especially important when an asset is in "poor" condition. Condition assessment priority scores are applied according to Table 1-6.

Table 1-6. Priority Weighted Scores for Condition Assessment

Condition Assessment	Priority Weighted Score
Poor	50
Fair	10
Good	5
Excellent	0

1.5.3 Operational Assessment

Projects that provide improvements to current operations are designated as "yes" (having operational benefit), whereas projects that do not explicitly provide for improvements to operations are designated as "no" (not having operational benefit). The operational improvement benefit priority scores are applied according to Table 1-7.

Table 1-7. Priority Weighted Scores for Operations Assessment

Operations Assessment	Priority Weighted Score
Yes	25
No	0

1.5.4 Failure / Consequence Assessment

Major assets in the District's water system are evaluated based on a failure mode and impact analysis that produces a "criticality" score calculated on the probability of failure and the related consequence of such a failure. Each element of the District water system has the ability to fail, and associated with that failure a potential consequence. The probability of failure can be high or low. Correspondingly, the consequences of that failure may be high or low. Therefore, by projecting both the probability of failure and the consequence of failure, the District can rank its infrastructure based on criticality. This ranking allows the District to address the most critical elements of its system in the initial portions of its facilities plan implementation.

The F/C priority scores applied to develop the "criticality" scores are described in Table 1-8.

Table 1-8. Priority Weighted Scores for Operations Assessment

F/C "Criticality" Score	Priority Weighted Score
75-100	100
60-74	75
50-59	45
40-49	35
30-39	25
20-29	10
10-19	5
0-9	0

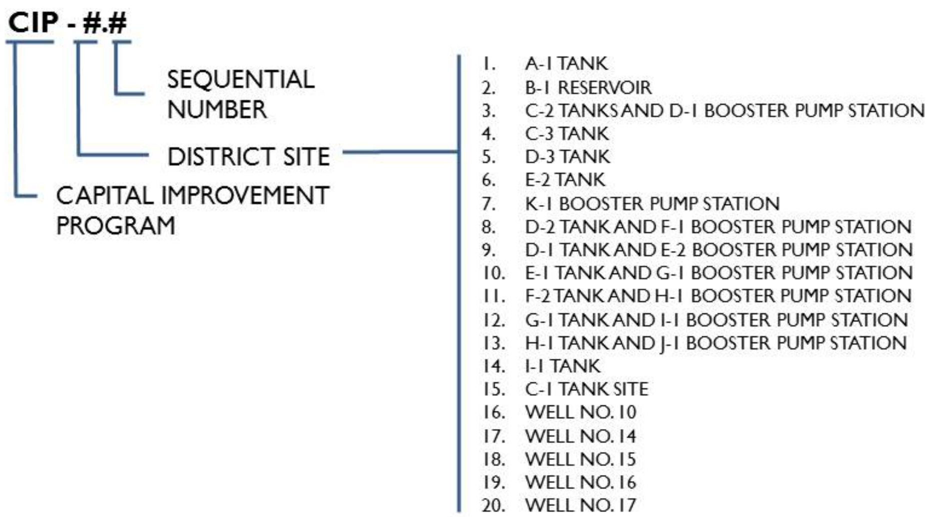
The above ranking criteria are used in Section 3 of this document to prioritize the various infrastructure needs for implementation by the District.

2 WATER SYSTEM CAPITAL IMPROVEMENT PROJECTS

2.1 Capital Improvement Project Identification

The following sections present specific and programmatic CIP projects identified for the District water system. These projects are organized by Asset Site in accordance with Figure 2-1:

Figure 2-1. Project Numbering Sequence



2.2 Water System Facilities

The following discussions identify the water system facilities (i.e. pump stations, reservoirs, wells) that the District is required to operate and maintain.

2.2.1 CIP 1.0: A-1 Tank Site

CIP 1.0: A-1 Tank Site Projects
CIP - 1.1 Tank Rehabilitation The A-1 tank is a 0.27 million-gallon welded steel tank constructed in 1975. The tank is constructed at an elevation of 2,580 feet and services the A pressure zone. The tank is 24 feet high with a diameter of 44 feet. The tank is in good to excellent condition. Records show that the tank was last recoated in 2001 and inspected in approximately 2007. Based on a useful coating life of approximately 10 years, the tank is due for cleaning and re-application of the protective coatings on the interior and exterior surfaces in approximately 2017. The tank undergoes regular inspection and maintenance to identify needed structural or other improvements, and will be scheduled for improvements when required.
CIP - 1.2 Tank Road Improvements The A-1 tank site is located at an elevated site at the northern extent of Sunever Road. The access road is extremely steep and dangerous, composed of relatively loose dirt and gravel. Over time, the road has deteriorated, further increasing difficulty for operations staff to safely access the tank site. The District has identified the need to re-grade the access road alignment to increase safety, incorporating a less steep alignment. The road grade of the access road will require concrete paving to provide the safer all-weather access required for the tank location.

Capital improvement project costs identified for A-1 Tank site are summarized in Table 2-1.

Table 2-1. A-1 Tank Site Projects

Projects	Cost
CIP – 1.1, A-1 Tank Rehabilitation	$168,900
CIP – 1.2, A-1 Tank Road Improvements	$317,700
Total	$486,600

2.2.2 CIP 2.0: B-1 Tank Site

CIP 2.0: B-1 Tank Site Projects
CIP - 2.1 Tank Rehabilitation The B-1 Reservoir is one of the District's newer constructed storage tanks. Built in 2001, the tank is 32 feet tall with a diameter of 80 feet. The reservoir has a storage capacity of 1.2 million gallons. The tank is constructed at an elevation of 2,772 feet and services the B pressure zone. The B-1 tank was inspected in approximately 2007 and found to be in good to excellent condition. As such, rehabilitation of the tank is not currently needed. The tank undergoes regular inspection by District staff and identified improvements will be scheduled as required in the future.

Capital improvement project costs identified for the B-1 Reservoir site are summarized in Table 2-2.

Table 2-2. B-1 Reservoir Site Projects

Projects	Cost
CIP – 2.1, B-1 Reservoir Rehabilitation	$531,400
Total	$531,400

2.2.3 CIP 3.0: C-2B Tank and D-1 Booster Pump Station Site

CIP3.0: C-2B Tank & D-1 Booster Pump Station Site Projects
CIP - 3.1 Tank Rehabilitation This site originally contained two tanks, including the C-2A and C-2B tanks. At this time, the C-2A tank is not in service, and the C-2B tank provides the District's required storage needs at this site. The C-2B Tank is a 5.58 million-gallon tank, with a height of 24 feet and a diameter of 199 feet. The tank was constructed in 2001, and was inspected in approximately 2007. The tank is considered to be in good to excellent condition. District staff provides regular inspection, and any required improvements will be scheduled as necessary.
CIP - 3.2 Tank Site Drainage When the C-2B tank was constructed, local residents were concerned with the visual nature of the large tank. As such, the tank design incorporated a large berm around the majority of the tank to provide a visual barrier for the neighboring properties along Avenida Del Sol. This berm has caused flooding around the tank perimeter during rain events, preventing access for the District operations staff and potentially undermining the tank's foundation. A drainage pipe and overflow basin have been installed to mitigate concerns associated with draining of the tank. Additional site drainage improvements are needed to prevent flooding around the tank during rain events. Additionally, the below-grade vault installed to house the tank altitude valve requires a perimeter wall to prevent sediment from covering the vault during rain events. Finally, the recently installed detention pond requires armoring and enlarging to accommodate draining of the tank.
CIP - 3.3 D-1-1 Booster Pump Station Mechanical Upgrades The D-1-1 Booster pump station consists of two (2) 30-HP centrifugal pumps and run on a lead/lag pump system. Each pump has a rated capacity of 300-gpm at 260-ft TDH. The Booster pumps transfer water from the C-2 Zone to the D-1 pressure zone. The pump station is currently in fair condition but will need eventual replacement to alleviate future demand deficiencies. Future mechanical replacement will include pump wet ends, motors, valves, piping and mechanical appurtenances. The pump house is in good condition and is not expected to require future upgrades.
CIP - 3.4 D1-1 Booster Pump Station Electrical Upgrades The existing electrical system for the D1-1 Pump Station is located outdoors within a wooden enclosure, near the south entrance of the site. The District does not currently have electrical schematics for this facility. Replacement of the electrical and SCADA systems at this site is required, preferably housing these facilities within the pump station structure to avoid exposure to the weather and outdoor elements.

Capital improvement project costs identified for the C-2B Tank and D1-1 Booster Pump Station are summarized in Table 2-3.

Table 2-3. C-2 Tanks and D-1 Booster Pump Station Projects

Projects	Cost
CIP – 3.1, C-2-A Tank Rehabilitation	$2,294,800
CIP – 3.2, C-2-B Tank Site Drainage	$332,500
CIP – 3.3, D-1-1 Booster Pump Station Mechanical Upgrades	$204,900
CIP – 3.4, D-1-1 Booster Pump Station Electrical Upgrades	$118,600
Total	$2,950,800

2.2.4 CIP 4.0: C-3 Tank Site

CIP 4.0: C-3 Tank Site Projects
CIP - 4.1 Tank Rehabilitation The C-3 tank is a 0.44 million-gallon welded steel tank constructed in 1975. The tank was recoated in 2001. The tank is constructed at an elevation of sits on the 2,937 feet and services the C pressure zone. The tank is 24 feet tall, with a diameter of 56 feet. The tank was last inspected in approximately 2007 and found to be in good to excellent condition. The C-3 tank undergoes regular inspection and maintenance, and required improvements will be scheduled by District staff as required.
CIP - 4.2 Tank Road Improvements The C-3 tank access road is located at the terminus of Moonlight Mesa Street. The length of the access road measures approximately 1,140 feet, and is composed of primarily of loose dirt and gravel. The access road follows a narrow ridge for a portion of its alignment. It is necessary to grade the access road. Additionally, guardrails are required along the ridge to separate vehicles from the steep embankment adjacent to the access road. The access road alignment is located on government-owned (Bureau of Land Management) land, and any improvements will require an amendment to the Bureau of Land Management right of way permit.

Capital improvement project costs identified for the C-3 Tank site are summarized in Table 2-4.

Table 2-4. C-3 Tank Site Projects

Projects	Cost
CIP – 4.1, C-3 Tank Rehabilitation	$239,900
CIP – 4.2, C-3 Tank Road Improvements	$213,400
Total	$453,300

2.2.5 CIP 5.0: D-3 Tank Site

CIP 5.0: D-3 Tank Site Projects
CIP - 5.1 Tank Rehabilitation The D-3 tank is a small storage tank with a capacity of 0.17 million gallons. The tank is a welded steel tank measuring 24 feet tall, with a diameter of 28 feet. The tank is constructed at an elevation of 3,026 feet and services the D3 pressure zone. The tank was constructed in 1989 and recently inspected in 2015. The tank was determined to be in good condition, with recoating of the interior of the tank needed in the near future. Regular inspection and maintenance of the tank is provided by District staff, and rehabilitation of the tank is currently programmed to be completed in the next year.
CIP - 5.2 Tank Road Improvements The access road for the D-3 tank is located near a private residence at the end of Lynn Lane. The tank site is owned by the government (Bureau of Land Management) and is leased by the District. The access road does not currently have an identified easement. An easement of approximately 1,300 feet is required to assure the District has rights to access the tank site well into the future. Additionally, it is recommended the access road be re-graded and compacted to provide an all-weather road for safety of operations staff.

Capital improvement project costs identified for the D-3 Tank site are summarized in Table 2-5.

Table 2-5. D-3 Tank Site Projects

Projects	Cost
CIP – 5.1, D-3 Tank Rehabilitation	$87,200
CIP – 5.2, D-3 Tank Road Improvements	$417,700
Total	$504,900

2.2.6 CIP 6.0: E-2 Tank Site

CIP 6.0: E2-1 Tank Site Projects
CIP - 6.1 Tank Rehabilitation The E2-1 Tank is a 0.27 million-gallon welded steel tank constructed in 1996. The tank is constructed at an elevation of 3,340 feet, and services the E2 pressure zone. The tank is 24 feet tall, with a diameter of 44 feet. The tank was inspected in approximately 2007. The tank is considered to be in good to excellent condition. Based on the most recent inspection, a useful coating life of 5 to 7 years was identified. Future improvements include cleaning and re-application of protective coatings on the interior and exterior surfaces. District staff regularly inspects the tank and will schedule the rehabilitation when required. District staff has identified the need for a ladder-cage on the exterior of the tank.

CIP 6.0: E2-1 Tank Site Projects
CIP - 6.2 Tank Road Improvements There is one possible access point to the E2-1 tank site, with the main access road located at the intersection of Sunny Vista Road and Moonlight Mesa Street. The existing access road is difficult to drive in adverse weather conditions, as it is composed of poorly graded dirt and gravel. The access road required re-grading and compacting to provide an all-weather road for operations staff. Additionally, the access road alignment is in some places located on government-owned (Bureau of Land Management) land, and an identifiable easement is required to assure access for District operations into the future.

Capital improvement project costs identified for the E2-1 Tank site are summarized in Table 2-6.

Table 2-6. E2-1 Tank Site Projects

Projects	Cost
CIP – 6.1, E2-1 Tank Rehabilitation	$146,900
CIP – 6.2, E2-1 Tank Road Improvements	$314,300
Total	$461,200

2.2.7 CIP 7.0: K-1 Booster Pump Station

CIP 7.0: K-1 Booster Pump Station Site Projects
CIP - 7.1 K-1 Booster Pump Station Site Improvements The K-1 station is a hydro-pneumatic pump station located off Navajo Trail. Over time, operation of the station has been difficult as the facilities are located outside in the elements. Covering of the pumps and other facilities is required to improve operations and protect the facilities. Improvements are planned to include a new building to house the facilities. Also, it has been discussed that a smaller, District-standard pump station could be constructed with a corresponding storage tank to eliminate the need for the hydro-pneumatic portions of the facility.
CIP - 7.2 K-1 Booster Pump Station Mechanical Upgrades The K-1 booster pump station consists of two 20-HP centrifugal pumps and one 75-HP fire-pump. The 20-HP pumps are rated for 150 gpm at 185 feet TDH, while the 75-HP fire pump has a rated capacity of 1000 gpm at 160 feet TDH. The pump station transfers water from the J pressure zone up to the K pressure zone. Currently, the pumps are located outdoors and have experienced wear due to exposure of the elements. Future replacement of the pumps, motors, valves, piping and mechanical appurtenances is required.
CIP - 7.3 K-1 Booster Pump Station Electrical Upgrades The electrical systems at the pump station are in need of replacement. The District does not have accurate electrical schematics for the station. The electrical equipment is exposed to the elements, located on the perimeter wall in metal enclosures. The equipment is out of date and in need of replacement. A complete electrical system upgrade is required, including relocating the components inside new District-standard building.

Capital improvement project costs identified for the K-1 Booster Pump Station are summarized in Table 2-7.

Table 2-7. K-1 Booster Pump Station Projects

Projects	Cost
CIP – 7.1, K-1 Booster Pump Station Site Improvements	$173,900
CIP – 7.2, K-1 Booster Pump Station Mechanical Upgrades	$208,200
CIP – 7.3, K-1 Booster Pump Station Electrical Upgrades	$131,300
Total	$513,400

2.2.8 CIP 8.0: D2-1 Tank and F-1 Booster Pump Station

CIP 8.0: D2-1 Tank & F-1 Booster Pump Station Site Projects
CIP - 8.1 D2-1 Tank Rehabilitation The D2-1 tank is a 0.56 million-gallon welded steel tank constructed in 1986. The tank is constructed at an elevation of sits on the 3,113 feet and services the D2 pressure zone. The tank is 24 feet tall, with a diameter of 63 feet. The tank was last inspected in 2015, and found to be in good condition. The tank undergoes regular inspection by District staff, and is currently planned for rehabilitation in one to two years.
CIP - 8.2 D2-1 Tank Site Improvements The D2-1 tank is located near the intersection of Alta Loma Drive and Sunnyhill Road. At this location, the tank site is exposed to theft or vandalism. Additional security fencing and surveillance cameras are needed to mitigate property damage. Additional site improvements include providing a direct access to Alta Loma Drive. The existing road runs parallel to Alta Loma Drive on adjacent property as a result of a significant grade change between the site and the roadway. It is necessary to modify the access road by re-grading the road to provide safer access for District operations staff.
CIP - 8.3 F-1 Booster Pump Station Mechanical Upgrades There are currently three (3) centrifugal pumps of varying horsepower at the F-1 Booster Pump Station. Pump motor sizes range from 20-HP to 60-HP with a capacity range of 250 gpm at 230 feet TDH to 500 gpm at 275 feet TDH. The pumps transfer water from the D2 pressure zone up to the F pressure zone. The pump station requires replacement of the pumps to increase total capacity and standardize the equipment with other stations. Mechanical replacement include pumps, motors, valves, and piping with a skid mounted packaged pump station consistent with recent District standards. The existing pump building will also need replacement to house the new upgraded facilities.
CIP - 8.4 F-1 Booster Pump Station Electrical Upgrades The electrical system for the F-1 pump station was constructed in the 1960s. The District does not currently have electrical schematics for the station. A complete electrical system and SCADA upgrade is required to accompany the proposed mechanical upgrades.

Capital improvement project costs identified for the D-2 Tank and F-1 Booster Pump Station are summarized in Table 2-8.

Table 2-8. D2-1 Tank and F-1 Booster Pump Station Projects

Projects	Cost
CIP – 8.1, D2-1 Tank Rehabilitation	$202,800
CIP – 8.2, D2-1 Tank Site Improvements	$160,600
CIP – 8.3, F-1 Booster Pump Station Mechanical Upgrades	$249,800
CIP – 8.4, F-1 Booster Pump Station Electrical Upgrades	$152,300
Total	$765,500

2.2.9 CIP 9.0: D1-2 Tank and E-2 Booster Pump Station

CIP 9.0: D1-2 Tank & E-2 Booster Pump Station Site Projects

CIP - 9.1 Tank Rehabilitation

The D1-2 tank is a 0.58 million-gallon welded steel tank constructed in 1998. The tank is constructed at an elevation of 3,140 feet and is one of two reservoirs servicing the D1 pressure zone. The tank measures 24 feet in height, with a diameter of 64 feet. The tank was last inspected in approximately 2007, and found to be in good to excellent condition with a useful life of approximately 10 to 12 years. Based on this useful life, it is anticipated that tank rehabilitation will be required in 2017. The tank undergoes regular inspection and maintenance by District staff, who will schedule the tank for rehabilitation when required. District staff has identified the need for a ladder-cage on the exterior of the tank.

CIP - 9.2 E-2-1 Booster Pump Station Mechanical Upgrades

The E2-1 booster pump station consists of two 40-HP centrifugal pumps, running on a lead/lag pump cycle. Each pump has a rated capacity of 300 gpm at 270 feet TDH. The booster pumps transfer water from the D1-2 reservoir to the E2 pressure zone. The pump units are in good shape and only need minor improvements. Additional pumps are required to accommodate increases in water demand. The future pump is proposed to be added to the existing pump station. The pump station building is in good condition, however, a swamp cooler is required to regulate the internal temperature.

CIP - 9.3 E-2-1 Booster Pump Station Electrical Upgrades

The electrical system is in good working condition and is not in need of immediate upgrades. When the pump station was originally installed, no electrical schematics of the system were included. This CIP item includes development of needed electrical schematics.

Capital improvement project costs identified for the D-1 Tank and E-2 Booster Pump Station are summarized in Table 2-9.

Table 2-9. D-2 Tank and F-1 Booster Pump Station Projects

Projects	Cost
CIP – 9.1, D-1-2 Tank Rehabilitation	$287,400
CIP – 9.2, E-2-1 Booster Pump Station Mechanical Upgrades	$50,900
CIP – 9.3, E-2-1 Booster Pump Station Electrical Upgrades	$41,100
Total	$379,400

2.2.10 CIP 10.0: E-1 Tank and G-1 Booster Pump Station

CIP 10.0: E-1 Tank & G-1 Booster Pump Station Site Projects
CIP - 10.1 Tank Rehabilitation The E-1 tank is one of the oldest reservoirs in the District, constructed in 1966. The welded steel tank has a total capacity of 0.30 million gallons and measures 40 feet in height, with a diameter of 36 feet. The tank is constructed at an elevation of 3,180 feet and services the E1 pressure zone. Records show that the tank was last recoated in 1998. The tank was inspected in approximately 2007, and found to be in good condition with a remaining service life of approximately 5 to 7 years. Based on this useful life, the tank is currently due for rehabilitation. The tank undergoes regular inspection and maintenance by District staff and will be scheduled for rehabilitation when required.
CIP - 10.2 E-1 Tank Site Improvements The access road for E-1 tank is located adjacent to Quail Springs Road, a dirt road adjacent to private property. During rain events, the road is impassable and in emergency situations the District operations staff cannot access the site. Improvements to the road include regular grading and drainage control. The road requires these efforts to maintain an all-weather road base. Additional site improvements include replacing the existing pump station vault. Currently, the pump station is located in a below grade vault which requires confined space access. A new District-standard pump station building will provide safer access for District operations staff. Security fencing and surveillance cameras are required to mitigate potential property damage.
CIP - 10.3 G-1 Booster Pump Station Mechanical Upgrades The G-1 booster pump station consists of two 20-HP inline horizontal pumps, running on a lead/lag pump cycle. The pumps have a rated capacity of 270 gpm at 210 feet TDH. The pump station transfers water from the E-1 reservoir to the G pressure zone. The pumps are outdated, inefficient and inconsistent with established District standard equipment. Replacement of the pumps is required to accommodate increases in future demand. A new skid-mounted pump station is proposed to be housed in the new pump station building.
CIP - 10.4 G-1 Booster Pump Station Electrical Upgrades The existing electrical panel for the G-1 pump station was constructed in the 1960's, and is located on a wooden panel adjacent to the existing pump station. With pump station replacement, a complete electrical and SCADA system upgrade is required. The upgrades include relocating the electrical and SCADA components into the building to avoid exposure to the weather.

Capital improvement project costs identified for the E-1 Tank and G-1 Booster Pump Station are summarized in Table 2-10.

Table 2-10. E-1 Tank and G-1 Booster Pump Station Projects

Projects	Cost
CIP – 10.1, E-1 Tank Rehabilitation	$181,900
CIP – 10.2, E-1 Tank Site Improvements	$129,800
CIP – 10.3, G-1 Booster Pump Station Mechanical Upgrades	$284,900
CIP – 10.4, G-1 Booster Pump Station Electrical Upgrades	$144,100
Total	$740,700

2.2.11 CIP 11.0: F-2 Tank and H-1 Booster Pump Station

CIP 11.0: F-2 Tank & H-1 Booster Pump Station Site Projects

CIP - 11.1 Tank Rehabilitation

The F-2 tank is a 0.44 million-gallon welded steel tank constructed in 1975. The tank is constructed at an elevation of 3,277 feet and services the F pressure zone. The tank is 24 feet tall, with a diameter of 56 feet. The tank was last re-coated in 1997. The tank was last inspected in approximately 2007, and found to be in excellent condition with a 10 to 12 year useful life. The tank is regularly inspected and maintained by District staff and will be scheduled for rehabilitation as necessary.

CIP - 11.2 H-1 Booster Pump Station Mechanical Upgrades

The H-1 booster pump station consists of two 25-HP centrifugal pumps, running on a lead/lag pump cycle. Both pumps have a rated capacity of 180 gpm at 175 feet TDH. The booster pumps transfer water from the F-2 tank to the H pressure zone. It is required that the pump station be replaced to accommodate future demand increases. The new pump station is planned to include a skid-mounted pump station conforming to District-standard requirements, including new pumps, motors, valves, and piping. The pump station building is proposed to be reused with the additional of interior insulation to attenuate sound for local residents.

CIP - 11.3 H-1 Booster Pump Station Electrical Upgrades

The existing electrical system at the H-1 pump station is outdated and has experienced deterioration. New electrical systems and SCADA upgrades are required to accompany the future mechanical upgrades. The District does not currently have electrical schematics for this pump station.

Capital improvement project costs identified for the F-2 Tank and H-1 Booster Pump Station are summarized in Table 2-11

Table 2-11. F-2 Tank and H-1 Booster Pump Station Projects

Projects	Cost
CIP – 11.1, F-2 Tank Rehabilitation	$170,900
CIP – 11.2, H-1 Booster Pump Station Mechanical Upgrades	$196,800
CIP – 11.3, H-1 Booster Pump Station Electrical Upgrades	$172,500
Total	$540,200

2.2.12 CIP 12.0: G-1 Tank and I-1 Booster Pump Station

CIP 12.0: G-1 Tank & I-1 Booster Pump Station Site Projects
CIP - 12.1 Tank Rehabilitation The G-1 reservoir is a welded steel tank constructed in 1966 and has a total capacity of 0.26 million gallons. The tank is 32 feet tall, with a diameter of 37 feet. The tank is constructed at an elevation of 3,401 feet and services the G pressure zone. Records show that the tank was recoated in 1997, and last inspected in approximately 2007. The tank was found to be in good condition with a 5 to 7 year useful coating life. Based on this useful coating life, the tank is currently due for cleaning and re-application of the protective coatings on the interior and exterior surfaces. The tank undergoes regular inspection and maintenance by District staff and will be scheduled for rehabilitation when required.
CIP - 12.2 I-1 Booster Pump Station Mechanical Upgrades The I-1 booster pump station consists of two 20-HP inline horizontal pumps, running on a lead/lag pump cycle. Both pumps have a rated capacity of 285 gpm at 230 feet TDH. The pump station transfers water from the G-1 tank to the I pressure zone. The pumps do not conform to District standards, and are out of date and inefficient. The pumps are located within a confined space, below-grade vault. The station is proposed to be replaced to accommodate for future demand. The new pump station includes a skid-mounted, District-standard package pump station including new pumps, motors, valves, and piping.
CIP - 12.3 I-1 Booster Pump Station Electrical Upgrades The electrical system for the I-1 pump station is located within a wooden housing, located adjacent to tank site entrance. The electrical controls are circa 1960 and are outdated. The electrical and SCADA systems are proposed to be replaced with current District-standard equipment. The upgrade includes relocating the components into the pump station building to avoid exposure to the weather. The District does not currently have electrical schematics for this station.

Capital improvement project costs identified for the G-1 Tank and I-1 Booster Pump Station are summarized in Table 2-12.

Table 2-12. G-1 Tank and I-1 Booster Pump Station Projects

Projects	Cost
CIP – 12.1, G-1 Tank Rehabilitation	$155,800
CIP – 12.2, I-1 Booster Pump Station Mechanical Upgrades	$248,000
CIP – 12.3, I-1 Booster Pump Station Electrical Upgrades	$152,600
Total	$556,400

2.2.13 CIP 13.0: H-1 Tank and J-1 Booster Pump Station

CIP 13.0: H-1 Tank & J-1 Booster Pump Station Site Projects

CIP - 13.1 Tank Rehabilitation

The H-1 tank is a 0.23 million-gallon welded steel tank constructed in 1975. The tank was recoated in 1997. The tank is constructed at an elevation of 3,449 feet and services the H pressure zone. The tank is 24 feet tall, with a diameter of 40 feet. The tank was last inspected in 2015 and found to be in good condition. The tank is currently scheduled for rehabilitation in the next one to two years.

CIP - 13.2 H-1B Tank Construction

In response to needed storage capacity the H pressure zone, a new tank has been designed and is ready for construction at the H-1 tank site. The new tank has a storage capacity of 0.32 million gallons. The H-1 site has available space for the new tank construction, avoiding the acquisition of additional land. The design of the new tank is completed and ready for bidding. The District has an existing decommissioned tank (C2-A Tank) which may be possible to move to the H-1 tank site. The District will evaluate the cost of new construction versus relocation at the time of the project.

CIP - 13.3 J-1 Booster Pump Station Mechanical Upgrades

The J-1 booster pump station consists of two 15-HP centrifugal pumps, running lead/lag pumping cycle. Both pumps have a rated capacity of 180 gpm at 175 feet TDH. The pumps transfer water from the H-1 tank to the J pressure zone. The pump station is currently in good condition but will need eventual replacement to account for future demand increases. The new pump station is proposed to be a skid-mounted package station consistent with current District standards, including new pumps, motors, valves, and piping. The pump station building is proposed to be reused with the addition of insulation to attenuate sound for local residents.

CIP – 13.4 J-1 Booster Pump Station Electrical Upgrades

The existing electrical system at the H-1 pump station is outdated. A complete electrical system and SCADA upgrade is required to accompany the future mechanical upgrades. The District does not currently have electrical schematics for this station.

Capital improvement project costs identified for the H-1 Tank and J-1 Booster Pump Station are summarized in Table 2-13.

Table 2-13. H-1 Tank and J-1 Booster Pump Station Projects

Projects	Cost
CIP – 13.1, H-1 Tank Rehabilitation	$112,900
CIP – 13.2, H-1 B New Tank	$828,700
CIP – 13.3, J-1 Booster Pump Station Mechanical Upgrades	$227,700
CIP – 13.4, J-1 Booster Pump Station Electrical Upgrades	$146,600
Total	$1,315,900

2.2.14 CIP 14.0: I-1 Tank Site

CIP 14.0: I-1 Tank Site Projects
CIP - 14.1 Tank Rehabilitation The I-1 tank is a 0.17 million-gallon welded steel tank constructed in 1966. The tank is constructed at an elevation of 3,612 feet and services the I pressure zone. The tank is 32 feet tall, with a diameter of 30 feet. The tank was recoated in 1997, and was recently inspected in approximately 2007. The tank was found to be in good condition with a projected useful coating life of 5 to 7 years. Based on this useful coating life, the tank is currently due for cleaning and re-application of the protective coatings on the interior and exterior surfaces. The tank undergoes regular inspection and maintenance by District staff, and will be scheduled for rehabilitation when appropriate.
CIP - 14.2 I-1 Tank Site Improvements The I-1 tank access road is located off Quail Springs Road. The road is unimproved, difficult to traverse and does not currently have an appropriate easement. An easement is required to secure District access rights. The roadway requires re-grading and compacting to provide an all-weather road base. Additional site improvements include the upgrade of the existing security system, installation of chain-link fencing, and surveillance cameras are recommended to prevent property vandalism.
CIP - 14.3 I-1B Tank Construction An increase in future water demand for emergency and fire storage will require the construction of a second I zone tank. The new tank will have a storage capacity of .15 million gallons. The second tank will also provide the ability to take a reservoir off line for maintenance. The existing I-1 site cannot support the addition of a second tank. Another location will be acquired for siting the additional new tank.

Capital improvement project costs identified for the I-1 Tank site are summarized in Table 2-14

Table 2-14. I-1 Tank Site Projects

Projects	Cost
CIP – 14.1, I-1 Tank Rehabilitation	$123,100
CIP – 14.2, I-1 Tank Site Improvements	$211,600
CIP – 14.3, I-1 B New Tank	$537,200
Total	$871,900

2.2.15 CIP 15.0: C-1 Tank and E1/D2 Booster Pump Station

CIP 15.0: C-1 Tank & E1/D2 Booster Pump Station Site Projects

CIP - 15.1 Tank Rehabilitation

The C-1 tank is a 1.35 million gallon welded steel tank constructed in 1975. The tank is constructed at an elevation of 2,937 feet and services the C pressure zone. The tank is 24 foot tall with a diameter of 150 feet. The tank is in good condition. The tank is regularly inspected, with future rehabilitation to be scheduled as needed. No work is required at this time.

CIP - 15.2/15.3 E1/D2 Booster Pump Station Upgrades

The E1/D2 booster pump station was recently reconstructed, with the two stations combined into a single building. All new mechanical and electrical equipment was installed. As such, no additional work is anticipated within the duration of this CIP planning period. District staff will monitor the station and incorporate CIP projects as necessary over time.

Capital improvement project costs identified for the I-1 Tank site are summarized in Table 2-15

Table 2-15. C-1 Tank and E1/D2 Booster Pump Station Projects

Projects	Cost
CIP – 15.1, C-1 Tank Rehabilitation	$0.00
CIP – 15.2, E1/D2 Pump Station Mechanical Upgrades	$0.00
CIP – 15.3, E1/D2 Pump Station Electrical Upgrades	$0.00
Total	$0.00

2.2.16 CIP 16.0: Well 10 Site

CIP 16.0: Well 10 Site Projects
<u>CIP - 16.1 Well 10 Building Upgrades</u> Well 10 is an existing water supply facility located on Park Blvd within the District's shop parking lot. The pump is currently exposed to the weather. This CIP item constructs a shade structure over the well pump and other facilities to minimize weather damage. Construction of separate buildings for electrical and chemical operations is required.
<u>CIP - 16.2 Well 10 Mechanical Upgrades</u> The Well 10 site consists of one 300-HP vertical turbine pump. The well is located in the C pressure zone, and has a capacity of approximately 1,200 gpm at 725 feet TDH. The well pump has undergone recent cleaning and rehabilitation in 2014, with several improvements to the mechanical components.
<u>CIP - 16.3 Well 10 Electrical Upgrades</u> The Well 10 facility does not have electrical schematics for operational use. It is required that accurate schematics be developed. Further electrical work consists of moving the site power feed to the well site and improvement of the electrical controls.

Capital improvement project costs identified for the Well No. 10 site are summarized in Table 2-16

Table 2-16. Well No. 10 Site Projects

Projects	Cost
CIP – 16.1, Well 10 Building Upgrades	$155,300
CIP – 16.2, Well 10 Mechanical Upgrades	$61,300
CIP – 16.3, Well 10 Electrical Upgrades	$150,100
Total	$366,700

2.2.17 CIP 17.0: Well 14 Site

CIP 17.0: Well 14 Site Projects
<u>CIP - 17.1 Well 14 Building Upgrades</u> The Well 14 site is located on Center Avenue, approximately one-half mile north of Twenty-nine Palms Highway. The well pump is currently exposed to the sun and outdoor elements. This CIP item will provide for construction of a shade structure over the pump and other exposed components to reduce further sun exposure and extend the useful life. Construction of separate buildings for electrical and chemical operations is required.

CIP 17.0: Well 14 Site Projects
CIP - 17.2 Well 14 Mechanical Upgrades Well 14 consists of one 500-HP vertical turbine pump and is located the C pressure zone. The well pump has a capacity of 1,945 gpm at a discharge pressure of 717 feet TDH. To prolong the useful life of the well, the mechanical equipment requires replacement in the near future.
CIP - 17.3 Well 14 Electrical Upgrades Well 14 does not currently have electrical schematics for District use. It is requires that current schematics be developed for the well facility. Other general upgrades for the electrical and SCADA system are required. The improvements include relocating the components into a building to avoid exposure to the weather and outdoor elements.

Capital improvement project costs identified for the Well No. 14 site are summarized in Table 2-17

Table 2-17. Well No. 14 Site Projects

Projects	Cost
CIP – 17.1, Well 14 Building Upgrades	$183,800
CIP – 17.2, Well 14 Mechanical Upgrades	$209,500
CIP – 17.3, Well 14 Electrical Upgrades	$146,300
Total	$539,600

2.2.18 CIP 18.0: Well 15 Site

CIP 18.0: Well 15 Site Projects
CIP - 18.1 Well 15 Building Upgrades The Well 15 site is located on La Ferney Avenue, approximately one mile north of Twenty-Nine Palms Highway. The well pump is currently exposed to the sun and outdoor elements. This CIP item will provide for construction of a shade structure over the pump and other exposed components to reduce further sun exposure and extend the useful life.
CIP - 18.2 Well 15 Mechanical Upgrades Well 15 consists of one 300-HP vertical turbine pump and is located the C pressure zone. The well pump has a capacity of 950 gpm. To prolong the useful life of the well, the mechanical equipment requires cleaning and rehabilitation in the near future.
CIP - 18.3 Well 15 Electrical Upgrades Other general upgrades for the electrical and SCADA system are required.

Capital improvement project costs identified for the Well No. 15 site are summarized in Table 2-18

Table 2-18. Well No. 15 Site Projects

Projects	Cost
CIP – 18.1, Well 15 Building Upgrades	$106,600
CIP – 18.2, Well 15 Mechanical Upgrades	$269,100
CIP – 18.3, Well 15 Electrical Upgrades	$132,300
Total	$508,000

2.2.19 CIP 19.0: Well 16 Site

CIP 19.0: Well 16 Site Projects
CIP - 19.1 Well 16 Building Upgrades The Well 16 site is located on the northwest corner of Sunfair Road and 4th Street S, approximately one and a half miles north of Twenty-Nine Palms Highway. The well pump is currently exposed to the sun and outdoor elements. This CIP item will provide for construction of a shade structure over the pump and other exposed components to reduce further sun exposure and extend the useful life.
CIP - 19.2 Well 16 Mechanical Upgrades Well 16 will not require mechanical upgrades in the near-term planning future.
CIP - 19.3 Well 16 Electrical Upgrades Well 16 will not require any electrical upgrades in the near-term planning future.

Capital improvement project costs identified for the Well No. 16 site are summarized in Table 2-19

Table 2-19. Well No. 16 Site Projects

Projects	Cost
CIP – 19.1, Well 16 Building Upgrades	$106,600
CIP – 19.2, Well 16 Mechanical Upgrades	-
CIP – 19.3, Well 16 Electrical Upgrades	-
Total	$106,600

2.2.20 CIP 20.0: Well No. 17 Site

CIP 20.0: Well 17 Site Projects
CIP - 20.1 Well 17 Building Upgrades Well 17 is located at the intersection of Twenty-nine Palms Hwy and Sunfair Rd. The existing well pump assembly and electrical system is exposed to the sun and weather. A shade structure is required as part of this project to protect the well system from further sun and weather exposure. The chlorine injection system will also require a new building to house the chemicals. This project will include a separate building to provide commercial water filling and public payment station. Water from well 17 will supply the fill station. There is minimal security provided at the site. Added improvements will include surveillance cameras to guard against vandalism.
CIP - 20.2 Well 17 Mechanical Upgrades Well 17 will not require mechanical upgrades in the near-term planning future.
CIP - 20.3 Well 17 Electrical Upgrades Well 17 will not require mechanical upgrades in the near-term planning future.

Capital improvement project costs identified for the Well No. 17 site are summarized in Table 2-20.

Table 2-20. Well No. 17 Site Projects

Projects	Cost
CIP – 20.1, Well 17 Building Upgrades	$238,800
CIP – 20.2, Well 17 Mechanical Upgrades	-
CIP – 20.3, Well 17 Electrical Upgrades	-
Total	$238,800

Additional CIP Considerations

The Water System CIP is intended to be a living document that will undergo annual review for the purposes of adding and updating project information. As such, the above list of project may not include all existing or future CIP assets. Water Assets that are not specifically addressed in Section 2.2 above are not in need of near-term improvements or were recent new construction. Projects will periodically be added or removed from the CIP for the purposes of long-term planning.

2.3 Water CIP Summary Sheets

Summary Sheets were developed for each of the projects identified in Section 2.2, and are provided in Appendix A. The purpose of the summary sheets is to provide District staff with a quick reference relative to the various projects. As the Water CIP is a "living document," project summaries are intended to be revised. Completed projects will be removed and new projects will be added.

Table 2-21 provides a summary of the Water CIP Facilities Costs, presented in Section 2.2.

Table 2-21. Water Facilities CIP Projects

			Class 5 Cost Opinions					
Site ID	Project ID	Project Description	Land Acquisition	Design	Environmental	Construction	District Admin & CM	Total
CIP 1.0	A-1 Tank Site							
	CIP 1.1	A-1 Tank Rehab	$ -	$ 8,200	$ 6,800	$ 136,200	$ 17,700	$ 168,900
	CIP 1.2	A-1 Tank Road Improvements	$ -	$ 20,200	$ 15,100	$ 252,100	$ 30,300	$ 317,700
		Total	$ -	$ 28,400	$ 21,900	$ 388,300	$ 48,000	$ 486,600
CIP 2.0	B-1 Reservoir Site							
	CIP 2.1	B-1 Reservoir Rehab	$ -	$ 18,200	$ 18,200	$ 454,100	$ 40,900	$ 531,400
		Total	$ -	$ 18,200	$ 18,200	$ 454,100	$ 40,900	$ 531,400
CIP 3.0	C-2 Tank and D-1 Booster Pump Station							
	CIP 3.1	C-2-B Tank Rehab	$ -	$ 98,900	$ -	$ 1,978,300	$ 217,600	$ 2,294,800
	CIP 3.2	C-2-B Tank Site Drainage	$ -	$ 16,900	$ -	$ 281,800	$ 33,800	$ 332,500
	CIP 3.3	D-1-1 Booster Pump Station Mechanical Upgrades	$ -	$ 16,500	$ -	$ 165,300	$ 23,100	$ 204,900
	CIP 3.4	D-1-1 Booster Pump Station Electrical Upgrades	$ -	$ 9,500	$ -	$ 94,900	$ 14,200	$ 118,600
		Total	$ -	$ 141,800	$ -	$ 2,520,300	$ 288,700	$ 2,950,800
CIP 4.0	C-3 Tank Site							
	CIP 4.1	C-3 Tank Rehab	$ -	$ 10,200	$ 6,100	$ 203,300	$ 20,300	$ 239,900
	CIP 4.2	C-3 Tank Road Improvements	$ 10,000	$ 12,900	$ 8,100	$ 161,400	$ 21,000	$ 213,400
		Total	$ 10,000	$ 23,100	$ 14,200	$ 364,700	$ 41,300	$ 453,300
CIP 5.0	D-3 Tank Site							
	CIP 5.1	D-3 Tank Rehab	$ -	$ 5,500	$ 3,500	$ 69,200	$ 9,000	$ 87,200
	CIP 5.2	D-3 Tank Road Improvements	$ 50,000	$ 18,400	$ 12,300	$ 306,300	$ 30,700	$ 417,700
		Total	$ 50,000	$ 23,900	$ 15,800	$ 375,500	$ 39,700	$ 504,900
CIP 6.0	E-2-1 Tank Site							
	CIP 6.1	E2-1 Tank Rehab	$ -	$ 7,400	$ -	$ 123,400	$ 16,100	$ 146,900
	CIP 6.2	E2-1 Tank Road Improvements	$ 50,000	$ 16,900	$ 8,500	$ 211,400	$ 27,500	$ 314,300
		Total	$ 50,000	$ 24,300	$ 8,500	$ 334,800	$ 43,600	$ 461,200
CIP 7.0	K-1 Booster Pump Station							
	CIP 7.1	K-1 Booster Pump Station Site Improvements	$ -	$ 11,500	$ -	$ 143,700	$ 18,700	$ 173,900
	CIP 7.2	K-1 Booster Pump Station Mechanical Upgrades	$ -	$ 16,500	$ -	$ 165,300	$ 26,400	$ 208,200
	CIP 7.3	K-1 Booster Pump Station Electrical Upgrades	$ -	$ 12,200	$ -	$ 101,800	$ 17,300	$ 131,300
		Total	$ -	$ 40,200	$ -	$ 410,800	$ 62,400	$ 513,400
CIP 8.0	D-2-1 Tank and F-1 Booster Pump Station							
	CIP 8.1	D-2-1 Tank Rehab	$ -	$ 8,700	$ -	$ 174,900	$ 19,200	$ 202,800
	CIP 8.2	D-2-1 Tank Site Improvements	$ -	$ 10,600	$ -	$ 132,800	$ 17,200	$ 160,600
	CIP 8.3	F-1 Booster Pump Station Mechanical Upgrades	$ -	$ 23,600	$ -	$ 196,700	$ 29,500	$ 249,800
	CIP 8.4	F-1 Booster Pump Station Electrical Upgrades	$ -	$ 17,300	$ -	$ 115,400	$ 19,600	$ 152,300
		Total	$ -	$ 60,200	$ -	$ 619,800	$ 85,500	$ 765,500
CIP 9.0	D-1-2 Tank and E-2-1 Booster Pump Station							
	CIP 9.1	D-1-2 Tank Rehab	$ -	$ 12,600	$ -	$ 252,100	$ 22,700	$ 287,400
	CIP 9.2	E-2-1 Booster Pump Station Mechanical Upgrades	$ -	$ 3,400	$ -	$ 42,000	$ 5,500	$ 50,900
	CIP 9.3	E-2-1 Booster Pump Station Electrical Upgrades	$ -	$ 2,700	$ -	$ 34,000	$ 4,400	$ 41,100
		Total	$ -	$ 18,700	$ -	$ 328,100	$ 32,600	$ 379,400
CIP 10.0	E-1 Tank and G-1 Booster Pump Station							
	CIP 10.1	E-1 Tank Rehab	$ -	$ 8,900	$ 6,000	$ 149,100	$ 17,900	$ 181,900
	CIP 10.2	E-1 Tank Site Improvements	$ -	$ 8,200	$ 5,200	$ 103,000	$ 13,400	$ 129,800
	CIP 10.3	G-1 Booster Pump Station Mechanical Upgrades	$ -	$ 22,100	$ 8,800	$ 220,900	$ 33,100	$ 284,900
	CIP 10.4	G-1 Booster Pump Station Electrical Upgrades	$ -	$ 13,000	$ 4,300	$ 108,400	$ 18,400	$ 144,100
		Total	$ -	$ 52,200	$ 24,300	$ 581,400	$ 82,800	$ 740,700

			Class 5 Cost Opinions					
Site ID	Project ID	Project Description	Land Acquisition	Design	Environmental	Construction	District Admin & CM	Total
CIP 11.0	**F-2 Tank and H-1 Booster Pump Station**							
	CIP 11.1	F-2 Tank Rehab	$ -	$ 8,600	$ 4,300	$ 143,700	$ 14,300	$ 170,900
	CIP 11.2	H-1 Booster Pump Station Mechanical Upgrades	$ -	$ 17,900	$ -	$ 149,100	$ 29,800	$ 196,800
	CIP 11.3	H-1 Booster Pump Station Electrical Upgrades	$ -	$ 15,100	$ -	$ 136,900	$ 20,500	$ 172,500
		Total	$ -	$ 41,600	$ 4,300	$ 429,700	$ 64,600	$ 540,200
CIP 12.0	**G-1 Tank and I-1 Booster Pump Station**							
	CIP 12.1	G-1 Tank Rehab	$ -	$ 6,800	$ -	$ 135,500	$ 13,500	$ 155,800
	CIP 12.2	I-1 Booster Pump Station Mechanical Upgrades	$ -	$ 12,600	$ -	$ 210,200	$ 25,200	$ 248,000
	CIP 12.3	I-1 Booster Pump Station Electrical Upgrades	$ -	$ 10,100	$ -	$ 126,100	$ 16,400	$ 152,600
		Total	$ -	$ 29,500	$ -	$ 471,800	$ 55,100	$ 556,400
CIP 13.0	**H-1 Tank and J-1 Booster Pump Station**							
	CIP 13.1	H-1 Tank Rehab	$ -	$ 5,700	$ -	$ 94,900	$ 12,300	$ 112,900
	CIP 13.2	H-1-B New Tank	$ -	$ -	$ -	$ 739,900	$ 88,800	$ 828,700
	CIP 13.3	J-1 Booster Pump Station Mechanical Upgrades	$ -	$ 13,300	$ -	$ 189,700	$ 24,700	$ 227,700
	CIP 13.4	J-1 Booster Pump Station Electrical Upgrades	$ -	$ 11,900	$ -	$ 119,200	$ 15,500	$ 146,600
		Total	$ -	$ 30,900	$ -	$ 1,143,700	$ 141,300	$ 1,315,900
CIP 14.0	**I-1 Tank Site**							
	CIP 14.1	I-1 Tank Rehab	$ -	$ 8,100	$ -	$ 101,800	$ 13,200	$ 123,100
	CIP 14.2	I-1 Tank Site Improvements	$ 20,000	$ 12,300	$ 6,100	$ 153,200	$ 20,000	$ 211,600
	CIP 14.3	I-1B Tank Construction	$ 75,000	$ 29,800	$ 14,900	$ 372,800	$ 44,700	$ 537,200
		Total	$ 95,000	$ 50,200	$ 21,000	$ 627,800	$ 77,900	$ 871,900
CIP 15.0	**C-1 Tank Site**							
	CIP 15.1	C-1 Tank Rehab	$ -	$ -	$ -	$ -	$ -	$ -
	CIP 15.2/.3	E1/D2 Pump Station Mech/Elec Upgrades	$ -	$ -	$ -	$ -	$ -	$ -
		Total	$ -	$ -	$ -	$ -	$ -	$ -
CIP 16.0	**Well No. 10**							
	CIP 16.1	Well 10 Building Upgrades	$ -	$ 6,600	$ -	$ 132,800	$ 15,900	$ 155,300
	CIP 16.2	Well 10 Mechanical Upgrades	$ -	$ 4,000	$ -	$ 50,300	$ 7,000	$ 61,300
	CIP 16.3	Well 10 Electrical Upgrades	$ -	$ 9,800	$ -	$ 122,000	$ 18,300	$ 150,100
		Total	$ -	$ 20,400	$ -	$ 305,100	$ 41,200	$ 366,700
CIP 17.0	**Well No. 14**							
	CIP 17.1	Well 14 Building Upgrades	$ -	$ 7,900	$ -	$ 157,000	$ 18,900	$ 183,800
	CIP 17.2	Well 14 Mechanical Upgrades	$ -	$ 13,900	$ -	$ 173,000	$ 22,600	$ 209,500
	CIP 17.3	Well 14 Electrical Upgrades	$ -	$ 6,300	$ -	$ 125,000	$ 15,000	$ 146,300
		Total	$ -	$ 28,100	$ -	$ 455,000	$ 56,500	$ 539,600
CIP 18.0	**Well No. 15**							
	CIP 18.1	Well 15 Building Upgrades	$ -	$ 4,600	$ -	$ 91,000	$ 11,000	$ 106,600
	CIP 18.2	Well 15 Mechanical Upgrades	$ -	$ 11,500	$ -	$ 230,000	$ 27,600	$ 269,100
	CIP 18.3	Well 15 Electrical Upgrades	$ -	$ 5,700	$ -	$ 113,000	$ 13,600	$ 132,300
		Total	$ -	$ 21,800	$ -	$ 434,000	$ 52,200	$ 508,000
CIP 19.0	**Well No. 16**							
	CIP 19.1	Well 16 Building Upgrades	$ -	$ 4,600	$ -	$ 91,000	$ 11,000	$ 106,600
	CIP 19.2	Well 16 Mechanical Upgrades	$ -	$ -	$ -	$ -	$ -	$ -
	CIP 19.3	Well 16 Electrical Upgrades	$ -	$ -	$ -	$ -	$ -	$ -
		Total	$ -	$ 4,600	$ -	$ 91,000	$ 11,000	$ 106,600
CIP 20.0	**Well No. 17**							
	CIP 20.1	Well 17 Building Upgrades	$ -	$ 10,200	$ -	$ 204,000	$ 24,600	$ 238,800
	CIP 20.2	Well 17 Mechanical Upgrades	$ -	$ -	$ -	$ -	$ -	$ -
	CIP 20.3	Well 17 Electrical Upgrades	$ -	$ -	$ -	$ -	$ -	$ -
		Total	$ -	$ 10,200	$ -	$ 204,000	$ 24,600	$ 238,800

TOTAL CIP PLANNING COST: $12,831,300

As shown in Table 2-21, the facilities portion of the District's Water CIP totals approximately $12,831,000. Assuming a pay-as-you-go funding program with an annual capital expenditure rate of $500,000, the program is projected to be accomplished in approximately 26 years. If the funding rate is increased to $750,000 per year, the program is completed in 17 years. Considering the average useful life of water mechanical equipment is approximately 15 to 20 year, the District may expect to begin the process of equipment replacement within that time period. Therefore, completing the CIP every 20 to 25 years may represent an adequate time period. However, if additional capital expenditure is available, completing the replacement cycle in less than 20 years is considered more beneficial to the District.

2.4 Water Distribution System

Similar to the process used for the Water System Facilities in Section 2.2 above, the Water Distribution System assets were also reviewed and prioritized for incorporation into the CIP. Analysis of the District water distribution system incorporated review of the entire 98 square mile service area of the District. District staff evaluated distribution facilities on the section (one square mile) by section basis. Mapping from the District's AutoCad and Geographic Information Systems (GIS) was used to develop pipeline distances and location. Distance measurements were developed from one system valve to the next, while also adding new and known pipeline information that was not previously incorporated into the District GIS system. Developed information was field verified to confirm the validity of the resulting information. Record drawings were also reviewed, where available, to confirm the type of pipe, installation dates, and other appurtenance information.

Once the information was gathered and organized, District staff met to define evaluation criteria for the distribution system analysis, conforming to the previously discussed evaluation methodology (Section 1.5). Table 2-22 reiterates the evaluation criteria used in the evaluation of distribution system assets.

Table 2-22. Distribution System Evaluation Criteria

Prioritization Category	Evaluation Criteria
Useful Life	Pipeline Age (Installation Date) Remaining Life Expectancy
Condition Assessment	Mainline Leaks Pipeline Material
Operational Assessment	Undersized Pipelines Water Quality Impacts
Failure/Consequence Assessment	Population Impacted Critical Facilities

District field crews were provided mapping and data sheets to identify specific problem areas. A total of 20 of the 98 sections within the District service area were identified to require distribution system improvements (keeping in mind that the District service area has large areas where no water service is currently provided).

Leak detection data was comprised over a 24-month period between 2012 and 2014. The information was evaluated to assure that inadvertent duplicate leak reports were eliminated. Mainline leaks were identified based on the crossing street provided in the field reports. Service line leaks were located using geospatial identification in the District GIS via Google Earth technologies. The District GIS uses 2010 Census data, on a Township and Range basis, to determine population within the subject sections.

Water quality information was derived from the District GIS, identifying location where dead-end pipelines exist throughout the distribution system requiring periodic flushing to maintain water quality. Flushing is accomplished through blow-off assemblies and fire hydrants. In addition, customer water quality reports were correlated for the years 2012 through 2014.

2.4.1 Minimum Pipeline Size

Determination of the minimum acceptable pipeline size was evaluated for the CIP, including a review of the District Rules and Regulations. The current District regulations include conflicting references to minimum pipeline size as discussed below:

- Article 7.3, Oversizing: "*Any water or waste water facility will be considered oversized if the size of such facility exceeds the "base size" capacity required to service the Applicant's development as determined by the District Engineer; provided that the minimum size of a pipeline for water and/or waste water service shall be eight inches (8") in diameter for single family residential use, and twelve inches (12") in diameter for commercial, industrial or institutional use*."
- Article 12.6, Pipelines: "*The District staff, in accordance with the Fire Department, will approve the final pipeline sizing in accordance with District Rules and Regulations, Water Master Plan criteria, and Board policy for any proposed water facility extension*."
- Article 12.9, Minimum Base Pipeline Sizes: "*All District mains which provide customer water service shall be a minimum of 6 inches in diameter. There will be no exceptions to this rule. The following "Base Size" criteria shall prevail unless engineering analysis indicates larger sizes are required.*"

In December 2005, the District updated its water system model and conducted fire flow analyses for the distribution system. Those analyses identified available fire flow throughout the system. From those analyses, it was recommended that 4-inch pipelines be upsized to the District-standard minimum 8-inch pipelines. Additionally, 6-inch pipelines were recommended to be upsized on a case by case basis to District-standard 8-inch pipelines, depending on the specific area and the fire flow conditions required. Fire flow requirements in 2005 (Table 2-23) were identified as follows:

Table 2-23. 2005 Fire Flow Requirements

Land Use	Minimum Required Fire Flow (gpm)	Required Duration (hrs)
Residential – Single Family	1,000	2
Residential – Multiple Family	1,500	2
Schools	1,500	3
Commercial & Industrial	3,000	3
Hospitals & Clinics	3,000	3

These fire flow requirements are now approximately 10 years old. Current fire flow regulations generally require a minimum fire flow of approximately 1,500 gpm for a period of 2 to 4 hours for residential homes. Similarly the average fire flow requirement from the table above for residential areas is approximately 1,500 gpm rate for a 2 to 3 hours period. For fire flow, the water system is required to be capable of providing the prescribed fire flow while meeting maximum-day demands and maintaining a minimum system pressure of 20 psi.

Within the fire vicinity, water conveyance exceeds 1,500 gpm, as water flow in larger system pipelines is increased by the demand of the fire (1,500 gpm). Increased flow increases friction losses, thereby decreasing system pressure. Smaller pipelines have greater pressure loss. Thus, 4- and 6-inch pipelines increase friction losses during fire conditions and limit available fire flow.

System looping is a mitigation factor, where water is delivered from two separate pipelines. A looped system conveys more water with lower friction loss. However, where looped facilities include small diameter pipelines (4- and 6-inch diameter), less capacity is available for mitigation and flow/pressure losses can remain a concern.

Establishing a larger minimum pipeline size also results in decreased operational cost. However, making the minimum pipe size too large can result in an age of water concern. The age of water is the time that the water spends in storage from the time it enters the system and when it exits the system. As the age of water increases, disinfection residual reduces. It is important to keep the water age to a minimum to avoid potential health and safety challenges.

Water system operation is a balance of hydraulics, health and safety concerns. An 8-inch minimum pipeline diameter accommodates these challenges in that the construction cost difference between a 6-inch and 8-inch pipeline is almost negligible. Also, an 8-inch pipeline has a conveyance capacity that supports the typical minimum fire flow of 1,500 gpm. The table below provides a comparison of 6- and 8-inch flow capacities for varying flow velocities.

Pipe Size (in)	Flow Capacity (gpm)					
	1.0 fps	2.0 fps	4.0 fps	8.0 fps	10.0 fps	12.0 fps
6	90	180	360	720	900	1,080
8	156	132	624	1,248	1,560	1,872

The 8-inch pipeline provides necessary fire flow at a velocity of 10 fps, while flowing at velocities of 2 to 5 fps under normal service conditions. The 6-inch pipeline flows in excess of 12 fps to meet fire flow, increasing friction and energy loss. The 6-inch pipeline flows at a greater velocity during normal operating conditions, also increasing operating costs. For these reasons, District staff recommends adopting a minimum pipeline size of 8-inch, and has used that criteria in the development of the distribution CIP.

A summary of the cost to replace identified undersized pipelines within each of the District's section is included in Table 2-24.

Table 2-24. Water Distribution System CIP Projects

			Class 5 Cost Opinions					
Township & Range	Project Description	Total Length Undersized Pipe Replacement (LF)	Land Acquisition	Design	Environmental	Construction	District Admin & Contracts	Total
T1N R6E 2	Upsize Undersized Pipe	15,750	$ -	$ 1,667,000	$ 1,565,000	$ 1,449,000	$ 1,478,000	$ 6,159,000
T1N R6E 11	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R6E 12	Upsize Undersized Pipe	32,643	$ -	$ 3,455,000	$ 3,245,000	$ 3,004,000	$ 3,065,000	$ 12,769,000
T1N R6E 13	Upsize Undersized Pipe	6,214	$ -	$ 658,000	$ 618,000	$ 572,000	$ 584,000	$ 2,432,000
T1N R6E 14	Upsize Undersized Pipe	9,372	$ -	$ 993,000	$ 933,000	$ 863,000	$ 881,000	$ 3,670,000
T1N R6E 22	Upsize Undersized Pipe	13,018	$ -	$ 1,378,000	$ 1,294,000	$ 1,198,000	$ 1,222,000	$ 5,092,000
T1N R6E 24	Upsize Undersized Pipe	26,853	$ -	$ 2,842,000	$ 2,669,000	$ 2,471,000	$ 2,521,000	$ 10,503,000
T1N R6E 25	Upsize Undersized Pipe	36,549	$ -	$ 3,868,000	$ 3,633,000	$ 3,363,000	$ 3,431,000	$ 14,295,000
T1N R6E 26	Upsize Undersized Pipe	14,435	$ -	$ 1,529,000	$ 1,436,000	$ 1,329,000	$ 1,356,000	$ 5,650,000
T1N R6E 34	Upsize Undersized Pipe	9,283	$ -	$ 984,000	$ 924,000	$ 855,000	$ 873,000	$ 3,636,000
T1N R6E 35	Upsize Undersized Pipe	26,718	$ -	$ 2,828,000	$ 2,656,000	$ 2,459,000	$ 2,509,000	$ 10,452,000
T1N R6E 36	Upsize Undersized Pipe	190,835	$ -	$ 20,191,000	$ 18,962,000	$ 17,557,000	$ 17,909,000	$ 74,619,000
T1N R7E 5	Upsize Undersized Pipe	2,686	$ -	$ 286,000	$ 268,000	$ 248,000	$ 253,000	$ 1,055,000
T1N R7E 6	Upsize Undersized Pipe	30,962	$ -	$ 3,277,000	$ 3,077,000	$ 2,849,000	$ 2,906,000	$ 12,109,000
T1N R7E 7	Upsize Undersized Pipe	4,032	$ -	$ 427,000	$ 401,000	$ 371,000	$ 379,000	$ 1,578,000
T1N R7E 15	Upsize Undersized Pipe	7,803	$ -	$ 826,000	$ 776,000	$ 718,000	$ 733,000	$ 3,053,000
T1N R7E 16	Upsize Undersized Pipe	13,584	$ -	$ 1,438,000	$ 1,350,000	$ 1,250,000	$ 1,275,000	$ 5,313,000
T1N R7E 18	Upsize Undersized Pipe	4,517	$ -	$ 479,000	$ 450,000	$ 416,000	$ 425,000	$ 1,770,000
T1N R7E 21	Upsize Undersized Pipe	3,805	$ -	$ 404,000	$ 380,000	$ 351,000	$ 359,000	$ 1,494,000
T1N R7E 22	Upsize Undersized Pipe	5,962		$ 632,000	$ 593,000	$ 549,000	$ 560,000	$ 2,334,000
T1N R7E 30	Upsize Undersized Pipe	6,658	$ -	$ 705,000	$ 663,000	$ 613,000	$ 626,000	$ 2,607,000
T1N R7E 32	Upsize Undersized Pipe	10,897		$ 1,154,000	$ 1,084,000	$ 1,003,000	$ 1,024,000	$ 4,265,000
T1N R7E 33	Upsize Undersized Pipe	3,701	$ -	$ 393,000	$ 369,000	$ 341,000	$ 348,000	$ 1,451,000
T1N R7E 34	Upsize Undersized Pipe	8,469	$ -	$ 897,000	$ 843,000	$ 780,000	$ 796,000	$ 3,316,000
T1N R7E 35	Upsize Undersized Pipe	17,993	$ -	$ 1,905,000	$ 1,789,000	$ 1,656,000	$ 1,690,000	$ 7,040,000
T1S R6E 1	Upsize Undersized Pipe	6,465	$ -	$ 685,000	$ 643,000	$ 595,000	$ 607,000	$ 2,530,000
T1S R6E 2	Upsize Undersized Pipe	6,176	$ -	$ 655,000	$ 615,000	$ 569,000	$ 581,000	$ 2,420,000
T1S R6E 3	Upsize Undersized Pipe	3,140	$ -	$ 333,000	$ 313,000	$ 289,000	$ 295,000	$ 1,230,000
T1S R7E 7	Upsize Undersized Pipe	10,658	$ -	$ 1,129,000	$ 1,060,000	$ 981,000	$ 1,001,000	$ 4,171,000
T1S R7E 8	Upsize Undersized Pipe	12,116	$ -	$ 1,283,000	$ 1,205,000	$ 1,115,000	$ 1,138,000	$ 4,741,000
T1S R6E 12	Upsize Undersized Pipe	22,206	$ -	$ 2,350,000	$ 2,207,000	$ 2,043,000	$ 2,084,000	$ 8,684,000
T1S R7E 18	Upsize Undersized Pipe	2,068		$ 220,000	$ 207,000	$ 191,000	$ 195,000	$ 813,000
T2N R6E 34	Upsize Undersized Pipe	10,109	$ -	$ 1,071,000	$ 1,006,000	$ 931,000	$ 950,000	$ 3,958,000
T2N R7E 31	Upsize Undersized Pipe	6,726	$ -	$ 712,000	$ 669,000	$ 619,000	$ 632,000	$ 2,632,000
T2N R7E 32	Upsize Undersized Pipe	17,723	$ -	$ 1,876,000	$ 1,762,000	$ 1,631,000	$ 1,664,000	$ 6,933,000
T1N R6E 23	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 1	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 2	Upsize Undersized Pipe	0		$ -	$ -	$ -	$ -	$ -
T1N R7E 3	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 4	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 9	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 10	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 11	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 12	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 13	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 14	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 23	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 24	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 31	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 36	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -

Township & Range	Project Description	Total Length Undersized Pipe Replacement (LF)	Land Acquisition	Design	Environmental	Construction	District Admin & Contracts	Total
T1S R7E 5	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R7E 6	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R6E 9	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R6E 10	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R6E 11	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R6E 13	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R6E 14	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R6E 15	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R6E 16	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1S R7E 17	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T2N R7E 29	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T2N R7E 35	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T2N R7E 36	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R6E 1	Upsize Undersized Pipe	2,763	$ -	$ 294,000	$ 276,000	$ 255,000	$ 261,000	$ 1,086,000
T1N R6E 27	Upsize Undersized Pipe	434	$ -	$ 46,000	$ 44,000	$ 40,000	$ 41,000	$ 171,000
T1N R6E 28	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R6E 33	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 8	Upsize Undersized Pipe	1,338	$ -	$ 143,000	$ 134,000	$ 124,000	$ 127,000	$ 528,000
T1N R7E 17	Upsize Undersized Pipe	1,443	$ -	$ 153,000	$ 144,000	$ 133,000	$ 136,000	$ 566,000
T1N R7E 19	Upsize Undersized Pipe	7,996	$ -	$ 847,000	$ 795,000	$ 736,000	$ 751,000	$ 3,129,000
T1N R7E 20	Upsize Undersized Pipe	23,364	$ -	$ 2,473,000	$ 2,322,000	$ 2,150,000	$ 2,193,000	$ 9,138,000
T1N R7E 25	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 26	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 27	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T1N R7E 28	Upsize Undersized Pipe	5,997	$ -	$ 635,000	$ 597,000	$ 552,000	$ 564,000	$ 2,348,000
T1N R7E 29	Upsize Undersized Pipe	3,233	$ -	$ 343,000	$ 322,000	$ 298,000	$ 304,000	$ 1,267,000
T1S R6E 4	Upsize Undersized Pipe	1,235	$ -	$ 132,000	$ 124,000	$ 114,000	$ 117,000	$ 487,000
T2N R6E 23	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T2N R6E 24	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T2N R6E 26	Upsize Undersized Pipe	5,313	$ -	$ 563,000	$ 529,000	$ 489,000	$ 499,000	$ 2,080,000
T2N R6E 27	Upsize Undersized Pipe	1,300	$ -	$ 138,000	$ 130,000	$ 120,000	$ 123,000	$ 511,000
T2N R6E 28	Upsize Undersized Pipe	3,350	$ -	$ 356,000	$ 334,000	$ 309,000	$ 316,000	$ 1,315,000
T2N R6E 35	Upsize Undersized Pipe	2,677	$ -	$ 285,000	$ 267,000	$ 247,000	$ 252,000	$ 1,051,000
T2N R6E 36	Upsize Undersized Pipe	7,354	$ -	$ 779,000	$ 732,000	$ 677,000	$ 691,000	$ 2,879,000
T2N R7E 20	Upsize Undersized Pipe	25,835	$ -	$ 2,734,000	$ 2,568,000	$ 2,377,000	$ 2,425,000	$ 10,104,000
T2N R7E 21	Upsize Undersized Pipe	15,959	$ -	$ 1,690,000	$ 1,587,000	$ 1,469,000	$ 1,499,000	$ 6,245,000
T2N R7E 22	Upsize Undersized Pipe	20,163	$ -	$ 2,134,000	$ 2,004,000	$ 1,855,000	$ 1,893,000	$ 7,886,000
T2N R7E 23	Upsize Undersized Pipe	75,338	$ -	$ 7,972,000	$ 7,487,000	$ 6,932,000	$ 7,071,000	$ 29,462,000
T2N R7E 24	Upsize Undersized Pipe	23,971	$ -	$ 2,537,000	$ 2,383,000	$ 2,206,000	$ 2,251,000	$ 9,377,000
T2N R7E 25	Upsize Undersized Pipe	5,649	$ -	$ 598,000	$ 562,000	$ 520,000	$ 531,000	$ 2,211,000
T2N R7E 26	Upsize Undersized Pipe	13,438	$ -	$ 1,423,000	$ 1,336,000	$ 1,237,000	$ 1,262,000	$ 5,258,000
T2N R7E 27	Upsize Undersized Pipe	2,660	$ -	$ 282,000	$ 265,000	$ 245,000	$ 250,000	$ 1,042,000
T2N R7E 28	Upsize Undersized Pipe	27,710	$ -	$ 2,933,000	$ 2,754,000	$ 2,550,000	$ 2,601,000	$ 10,838,000
T2N R7E 30	Upsize Undersized Pipe	6,449	$ -	$ 684,000	$ 642,000	$ 594,000	$ 606,000	$ 2,526,000
T2N R7E 33	Upsize Undersized Pipe	0	$ -	$ -	$ -	$ -	$ -	$ -
T2N R7E 34	Upsize Undersized Pipe	0	$ -	$ 279,000	$ 262,000	$ 242,000	$ 247,000	$ 1,030,000
						TOTAL CIP PLANNING COST:		**$ 347,309,000**

As seen in Table 2-24, the conveyance portion of the District's Water CIP totals approximately $347,309,000, including only the costs to upsize undersized pipelines to 8-inch. An additional $321,850,000 is projected to replace the remaining pipelines (replace in kind) as their service life expires.

The District completed an initial prioritization of the identified conveyance projects, as shown in Table 2-24 above. Based on that prioritization, four of the top priority projects where identified by District staff to be completed first. The prioritization process was completed for conveyance projects throughout the

District service area as described in Section 3. A detailed description of the top four conveyance projects is included in the following discussions.

2.4.2 Section T2N R7E 32

Data collection conducted by District staff in review of Section T2N R7E 32 was significant, and resulted in the information in Table 2-25:

Table 2-25. Section T2N R7E 32 Data Summary

PIPELINE REPLACEMENT SECTION: T2N R7E 32	
Elevation = 2900' (Obtained from Google Earth)	Hydrant Valves = 19 (Obtained from GIS Coordinator)
Total Pipeline = 32,000 Linear Feet (Obtained from Sectional Capital Improvement Map)	Hydrants = 19 (Obtained from GIS Coordinator)
In Line Valves = 32 / Air-Vacs = 7 / Blow-Off's = 4	Auxiliary Water Supply (C-3 Tank) = 499,000 gallons

T2N R7E 32 (100%)							
Size	LF	Rules & Regulations (Art. 12.19)	Valves	Hydrant Valves		Rules & Regulations (Art. 12.15)	Hydrants
4"	0	660.00	0	0		300.00	0
6"	17723	660.00	27	59		300.00	59
8"	9194	660.00	14	31		300.00	31
10"	0	0.00	0	0		300.00	0
12"	3684	1320.00	3	12		300.00	12
14"	0	0.00	0	0		300.00	0
16"	1373	2640.00	1	5		300.00	5
20"	0	0.00	0	0		300.00	0
Total	31974		44	107		2400.00	107
Total Valves			151		Total Hydrants		107
(32 + 19) Actual Valves			51		Actual Hydrants		19
Difference			100		Difference		88
Valve Deficiency			66%		Fire Suppression Deficiency		82%

T2N R7E 32 (Replacement Area 27.83%)							
Size	LF	Rules & Regulations (Art. 12.19)	Valves	Hyd. Valves		Rules & Regulations (Art. 12.15)	Hydrants
8"	8900	660.00	13	30		300.00	30
Total	8900		13	30			30
Total Valves Required In Section			151	Total Hydrants Required In Section			107
(32 + 19) Actual Valves			51	Actual Hydrants			19
(27.83% of Actual Valves) Est. Valves in Replacement Area			14	(27.83% of Actual Hydrants) Est. Hydrants in Replacement Area			5
New Valves			43	New Hydrants			30

Difference	80	Difference	63
Valve Deficiency	53%	Fire Suppression Deficiency	59%
Improvement	13%	Improvement	23%

PROJECT JUSTIFICATION	
Pipeline dated back to 1968 (Shown on Score Card)	Critical transmission lines supporting auxiliary water supply of 500,000 gallons
82% deficient in fire suppression	66% deficient in control valves
Many inoperable valves requiring large area shutdowns.	Bolster Existing Transmission Lines
Eliminate 50% of undersized pipe (8,900LF/17,723LF)	23% Fire Suppression Improvement

Based on the information gathered and evaluated, one CIP project was defined (Table 2-26) within Section T2N R7E 32. The project is described as follows:

Table 2-26. Distribution System Project Definition

PROJECT: T2N R7E 32.1
Project Description: Replacement of 8,900 linear feet of existing 6-inch Steel Pipeline (circa 1960)
Project Location: Tilford Way to Labrisa and Rice to Mountain Shadow
Project Benefits: Elimination of Numerous Broken Valves and Leaks

2.4.3 Section T1N R6E 35

Data collection conducted by District staff in review of Section T1N R6E 35 was significant, and resulted in the information in Table 2-27:

Table 2-27. Section T1N R6E 35 Data Summary

PIPELINE REPLACEMENT SECTION: T2N R7E 32	
Elevation = 3100 feet (Obtained from Google Earth)	Hydrant Valves = 101 (Obtained from GIS Coordinator)
Total Pipeline = 66,000 Linear Feet (Obtained from Sectional Capital Improvement Map)	Hydrants = 101 (Obtained from GIS Coordinator)
In Line Valves = 118	Auxiliary Water Supply (C-1, D2-1, E-1 Tank) = 2,257,000 gals

T1N R6E 35 (100%)							
Size	LF	Rules & Regulations (Art. 12.19)	Valves	Hyd Valves		Rules & Regulations (Art. 12.15)	Hydrants
4"	5248	660.00	8	17		300.00	17
6"	21470	660.00	33	72		300.00	72

T1N R6E 35 (100%)							
8"	24389	660.00	37	81		300.00	81
10"	0	0.00	0	0		300.00	0
12"	13291	1320.00	10	44		300.00	44
14"	0	0.00	0	0		300.00	0
16"	1585	2640.00	1	5		300.00	5
20"	0	0.00	0	0		300.00	0
Total	65983		88	220		2400.00	220
		Total Valves	308		Total Hydrants		220
		(118 + 101) Actual Valves	219		Actual Hydrants		101
		Difference	89		Difference		119
		Valve Deficiency	29%		Fire Suppression Deficiency		54%

T1N R6E 35 (Replacement Area 23%)							
Size	LF	Rules & Regulations (Art. 12.19)	Valves	Hyd Valves		Rules & Regulations (Art. 12.15)	Hydrants
8"	15171	660.00	23	51		300.00	51
Total	15171		23	51			51
		Total Valves Required In Section	308			Total Hydrants Required In Section	220
		Actual Valves	219			Actual Hydrants	101
		(27.83% of Actual Valves) Est. Valves in Replacement Area	50			(23% of Actual Hydrants) Est. Hydrants in Replacement Area	23
		New Valves	74			New Hydrants	51
		Difference	243			Difference	91
		Valve Deficiency	21%			Fire Suppression Deficiency	41%
		Improvement	8%			Improvement	13%

PROJECT JUSTIFICATION	
9.4% of ratepayers live here (1294/13710)	10% of water quality complaints originate from this area (5 WQC/49 WQC)
2nd highest area in water leaks	40% of pipeline is undersized (26,718LF/65983LF)
75 PSI Reducing Station drops PSI by 75 PSI	Critical Facilities (i.e. Pressure Reducing Station, Arts & Culture)
Phase I & II Eliminate 56% of undersized pipe 15,171/26,718)	13% Fire Suppression Improvement

Based on the information gathered and evaluated, two CIP projects were defined (Table 2-28) within Section T1N R6E 35. The projects are described as follows:

Table 2-28. Distribution System Project Definition

PROJECT: T1N R6E 35.1	
Project Description:	Replacement of 2,160 linear feet of existing 6-inch Steel Pipeline (circa 1960) and 5,560 linear feet of existing 4-inch Steel Pipeline (circa 1960)
Project Location:	In Easement west of Saddleback (between APNs 060216112 and 060216109)
Project Benefits:	Elimination of Numerous Leaks, Improved Fire Protection, Commercial Users

PROJECT: T1N R6E 35.2	
Project Description:	Replacement of 1,400 linear feet of existing 4-inch Steel Pipeline (circa 1960), 00 linear feet of existing 6-inch Steel Pipeline (circa 1960), 1,100 lf of existing 6-inch Steel pipeline, 550 lf of 2-inch PVC pipeline, 150 lf of 8-inch Steel pipeline, 2,500 LF of 6-inch Steel pipeline, and 750 lf of 6-inch Steel pipeline
Project Location:	Various small segments within the identified section.
Project Benefits:	Commercial Users, Eliminates Leaks and Broken Valves, Engineering partially complete.

2.4.4 Section T1N R6E 34

Data collection conducted by District staff in review of Section T1N R6E 34 was significant, and resulted in the information in Table 2-29:

Table 2-29. Section T1N R6E 34 Data Summary

PIPELINE REPLACEMENT SECTION: T2N R7E 32	
Elevation = 3250 feet (Obtained from Google Earth)	Hydrant Valves = 40 (Obtained from GIS Coordinator)
Total Pipeline = 35,600 Linear Feet (Obtained from Sectional Capital Improvement Map)	Hydrants = 40 (Obtained from GIS Coordinator)
In Line Valves = 75	Auxiliary Water Supply (F-2) = 441,000 gals

T1N R6E 34 (100%)							
Size	LF	Rules & Regulations (Art. 12.19)	Valves	Hyd Valves		Rules & Regulations (Art. 12.15)	Hydrants
4"	6971	660.00	11	23		300.00	23
6"	2312	660.00	4	8		300.00	8
8"	9202	660.00	14	31		300.00	31
10"	0	0.00	0	0		300.00	0
12"	11805	1320.00	9	39		300.00	39
14"	0	0.00	0	0		300.00	0
16"	5303	2640.00	2	18		300.00	18
20"	0	0.00	0	0		300.00	0

Total	35593		39	119		2400.00	119
Total Valves			158		Total Hydrants		119
(75 + 40) Actual Valves			115		Actual Hydrants		40
Difference			43		Difference		79
Valve Deficiency			27%		Fire Suppression Deficiency		66%

T1N R6E 34 (Replacement Area 19.59%)							
Size	LF	Rules & Regulations (Art. 12.19)	Valves	Hyd Valves		Rules & Regulations (Art. 12.15)	Hydrants
8"	6971	660.00	11	23		300.00	23
Total	6971		11	23			23
Total Valves Required In Section			158	Total Hydrants Required In Section			119
75 + 40) Actual Valves			115	Actual Hydrants			40
(19.59% of Actual Valves) Est. Valves in Replacement Area			23	(19.59% of Actual Hydrants) Est. Hydrants in Replacement Area			8
New Valves			34	New Hydrants			23
Difference			126	Difference			64
Valve Deficiency			20%	Fire Suppression Deficiency			53%
Improvement			7%	Improvement			12%

PROJECT JUSTIFICATION	
66% deficient in fire suppression	27% deficient in control valves
26% of the main is undersized [(6971+2312)/35593]	3.4% of ratepayers live here (468/13710)
Eliminate 75% of Undersized Pipe (6971/9283)	13% Fire Suppression Improvement

Based on the information gathered and evaluated, one CIP project was defined (**Error! Reference source not found.**30) within Section T1N R6E 34. The project is described as follows:

Table 2-30. Distribution System Project Definition

PROJECT: T1N R6E 34.1	
Project Description:	Replacement of 950 linear feet of existing 4-inch Steel Pipeline (circa 1960) and 6,100 linear feet of existing 4-inch Steel Pipeline (circa 1960)
Project Location:	From Sunburst, north to Highway 62 between Torres and Sunny Vista
Project Benefits:	Elimination of Numerous Leaks, Improved Fire Protection, Operationally Unstable, Pipeline Depth Unsatisfactory.

Capital improvement project costs identified for the four Distribution System Projects are summarized in Table 2-31.

Table 2-31. Water Distribution System CIP Projects

Projects	Cost
CIP – T2N R7E 32.1	$2,562,000
CIP – T1N R6E 35.1	$2,227,000
CIP – T1N R6E 35.2	$2,262,000
CIP – T1N R6E 34.1	$2,134,000
Total	$9,190,000

3 IMPLEMENTATION PLAN

3.1 Water Facilities Prioritized Scheduling

Using the prioritization factors described in Chapter 1, a final priority score is developed for each defined CIP project. The priority scores are presented in Table 3-1. The priority scores are also provided along with individual project summary pages. While the priority scores range between 15 to 200, a total of 38 of the 57 defined projects (66%) have priority scores of 100 or less. The highest priority projects received scores between 100 and 200. These projects are scheduled to be completed in the first seven years of the program. Lower propriety project are scheduled to occur in years beyond the initial seven-year period.

Table 3-1. Water Facilities CIP Project Prioritization Scoring

Tier	Facility/CIP No.	Expected Useful Life (Years)	Remaining Useful Life (Years)	Weighted Score (0-25)	Operational Assessment	Weighted Score (0-25)	Condition Assessment	Score for Failure Analysis	Weighted Score (0-50)	Criticality (1-100)	Priority Weighted Score	Total
CIP 1.0	A-1 Tank Site											
	CIP 1.1 A-1 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
	CIP 1.2 A-1 Tank Road Improv	25	5	25	No	0	Poor	0.25	50	36	25	100
CIP 2.0	B-1 Reservoir Site											
	CIP 2.1 B-1 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
CIP 3.0	C-2 Tank and D-1 Booster Pump Station											
	CIP 3.1 C-2B Tank Rehab	15	10	10	Yes	25	Good	0.75	5	46	35	75
	CIP 3.2 C-2B Site Drainage	25	0	25	No	0	Poor	0.25	50	33	25	100
	CIP 3.3 D-1-1- Booster PS Mech Upgrades	25	5	25	Yes	25	Fair	0.5	10	81	100	160
	CIP 3.4 D-1-1- Booster PS Elec Upgrades	20	5	25	Yes	25	Good	0.75	5	69	75	130
CIP 4.0	C-3 Tank Site											
	CIP 4.1 C-3 Tank Rehab	15	5	25	Yes	25	Good	0.75	5	56	45	100
	CIP 4.2 C-3 Tank Road Improv	25	10	10	No	0	Poor	0.25	50	34	25	85
CIP 5.0	D-3 Tank Site											
	CIP 5.1 D-3 Tank Rehab	15	5	25	Yes	25	Good	0.75	5	56	45	100
	CIP 5.2 D-3 Tank Road Improv	25	10	10	No	0	Poor	0.25	50	34	25	85
CIP 6.0	E-2-1 Tank Site											
	CIP 6.1 E-2 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
	CIP 6.2 E-2 Tank Road Improv	25	10	10	No	0	Poor	0.25	50	34	25	85
CIP 7.0	K-1 Booster Pump Station											
	CIP 7.1 K-1 Booster PS Site Improv	25	15	5	No	0	Fair	0.5	10	54	45	60
	CIP 7.2 K-1 Booster PS Mech Upgrades	25	5	25	Yes	25	Fair	0.5	10	77	100	160
	CIP 7.3 K-1 Booster PS Elec Upgrades	20	10	10	Yes	25	Poor	0.25	50	74	75	160
CIP 8.0	D-2-1 Tank and F-1 Booster Pump Station											
	CIP 8.1 D-2-1 Tank Rehab	15	5	25	Yes	25	Good	0.75	5	56	45	100
	CIP 8.2 D-2-1 Tank Site Improv	25	10	10	No	0	Poor	0.25	50	29	10	70
	CIP 8.3 F-1 Booster PS Mech Upgrades	25	5	25	Yes	25	Fair	0.5	10	77	100	160
	CIP 8.4 F-1 Booster PS Elec Upgrades	20	10	10	Yes	25	Poor	0.25	50	74	75	160
CIP 9.0	D-1-2 Tank and E-2-1 Booster Pump Station											
	CIP 9.1 D1-2 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
	CIP 9.2 E-2-1 Booster PS Mech Upgrades	25	15	5	Yes	25	Good	0.75	5	47	35	70
	CIP 9.3 E-2-1 Booster PS Elec Upgrades	20	10	10	Yes	25	Good	0.75	5	53	45	85
CIP 10.0	E-1 Tank and G-1 Booster Pump Station											
	CIP 10.1 E-1 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
	CIP 10.2 E-1 Tank Site Improv	25	15	5	No	0	Poor	0.25	50	28	10	65
	CIP 10.3 G-1 Booster PS Mech Upgrades	25	15	5	Yes	25	Poor	0.25	50	72	75	155
	CIP 10.4 G-1 Booster PS Elec Upgrades	20	10	10	Yes	25	Poor	0.25	50	74	75	160

Tier	Facility/CIP No.	Expected Useful Life (Years)	Remaining Useful Life (Years)	Weighted Score (0-25)	Operational Assessment	Weighted Score (0-25)	Condition Assessment	Score for Failure Analysis	Weighted Score (0-50)	Criticality (1-100)	Priority Weighted Score	Total
CIP 11.0	**F-2 Tank and H-1 Booster Pump Station**											
	CIP 11.1 F-2 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
	CIP 11.2 H-1 Booster PS Mech Upgrades	25	5	25	Yes	25	Poor	0.25	50	81	100	200
	CIP 11.3 H-1 Booster PS Elec Upgrades	20	5	25	Yes	25	Poor	0.25	50	80	100	200
CIP 12.0	**G-1 Tank and I-1 Booster Pump Station**											
	CIP 12.1 G-1 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
	CIP 12.2 I-1 Booster PS Mech Upgrades	25	5	25	Yes	25	Poor	0.25	50	81	100	200
	CIP 12.3 I-1 Booster PS Elec Upgrades	20	5	25	Yes	25	Poor	0.25	50	80	100	200
CIP 13.0	**H-1 Tank and J-1 Booster Pump Station**											
	CIP 13.1 H-1 Tank Rehab	15	15	5	Yes	25	Good	0.75	5	19	5	40
	CIP 13.2 H-1B Tank Construct	15	0	25	Yes	25	Excellent	1	0	35	25	75
	CIP 13.3 J-1 Booster PS Mech Upgrades	25	5	25	Yes	25	Poor	0.25	50	81	100	200
	CIP 13.4 J-1 Booster PS Elec Upgrades	20	5	25	Yes	25	Poor	0.25	50	80	100	200
CIP 14.0	**I-1 Tank Site**											
	CIP 14.1 I-1 Tank Rehab	15	10	10	Yes	25	Good	0.75	5	38	25	65
	CIP 14.2 I-1 Tank Site Improv	25	15	5	No	0	Poor	0.25	50	28	10	65
	CIP 14.3 I-1B Tank Construct	15	10	10	No	0	Excellent	1	0	12	5	15
CIP 15.0	**C-1 Tank and E1/D2 Booster Pump Station**											
	CIP 15.1 C-1 Tank Rehab	15	15	5	Yes	25	Excellent	1	0	0	0	30
	CIP 15.2 E1/D2 Booster PS Upgrades	25	25	0	Yes	25	Excellent	1	0	0	0	25
CIP 16.0	**Well No. 10**											
	CIP 16.1 Well 10 Building Upgrades	30	25	0	No	0	Poor	0.25	50	30	10	60
	CIP 16.2 Well 10 Mech Upgrades	25	20	5	Yes	25	Fair	0.5	10	59	45	85
	CIP 16.3 Well 10 Elec Upgrades	25	10	10	Yes	25	Good	0.75	5	68	75	115
CIP 17.0	**Well No. 14**											
	CIP 17.1 Well 14 Building Upgrades	50	0	25	No	0	Excellent	1	0	38	25	50
	CIP 17.2 Well 14 Mech Upgrades	25	0	25	Yes	25	Poor	0.25	50	100	100	200
	CIP 17.3 Well 14 Elec Upgrades	25	0	25	Yes	25	Poor	0.25	50	100	100	200
CIP 18.0	**Well No. 15**											
	CIP 18.1 Well 15 Building Upgrades	50	0	25	No	0	Excellent	1	0	38	25	50
	CIP 18.2 Well 15 Mech Upgrades	25	15	5	Yes	25	Good	0.75	5	54	45	80
	CIP 18.3 Well 15 Elec Upgrades	25	5	25	Yes	25	Good	0.75	5	83	100	155
CIP 19.0	**Well No. 16**											
	CIP 19.1 Well 16 Building Upgrades	50	0	25	No	0	Excellent	1	0	38	25	50
	CIP 19.2 Well 16 Mech Upgrades	25	20	5	Yes	25	Excellent	1	0	19	5	35
	CIP 19.3 Well 16 Elec Upgrades	25	20	5	Yes	25	Excellent	1	0	19	5	35
CIP 20.0	**Well No. 17**											
	CIP 20.1 Well 17 Building Upgrades	50	0	25	No	0	Excellent	1	0	38	25	50
	CIP 20.2 Well 17 Mech Upgrades	25	20	5	Yes	25	Excellent	1	0	19	5	35
	CIP 20.3 Well 17 Elec Upgrades	25	20	5	Yes	25	Excellent	1	0	19	5	35

3.2 Water Distribution System Prioritized Scheduling

District staff completed the evaluation of the District's 96 square mile service area, identifying 35 square miles with known pipeline challenges. The identified needs are prioritized in a manner similar to that of the Water System Facilities. As with the facilities, discussed in Section 2.2, there are a large number of identified distribution system projects. The four previously-defined top priority projects are considered first for near-term District implementation. The remaining identified projects are added to the Water System CIP in future years, resulting in an ongoing process of project implementation and new project definition based on the overall project prioritization in this evaluation.

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Table 3-2. Distribution System Priority Table

		Expected Useful Life			Operational Assessment				Condition Assessment										Failure/Consequence Assessment		
Tier	Township & Range	Range (Year)	AVG (Year)	Weighted Score (0-25)	WQ Complaints 12'-14'	Dead Ends	Undersized (Below 8")	Weighted Score (0-25)	*QTY in Database (leaks) 12'-14'	4" ACP	4" DIP	4" PVC (C900)	4" SP	6" ACP	6" DIP	6" PVC (C900)	6" SP	Weighted Score (0-50)	2010 Population	Weighted Score (0-100)	TOTAL
1	T1S R7E 8	1967-1967	1967	25	1	1	12,116	25	12	0	0	0	2224	0	0	0	9892	50	425	70	170
	T1S R7E 7	1967-1998	1976	5	1	7	10,658	25	11	0	0	660	0	3428	0	678	5892	50	167	85	165
	T1N R6E 36	1969-1999	1980	5	2	4	274,473	0	22	0	0	0	18606	70595	0	5803	47438	50	910	100	155
	T1N R6E 25	1968-1999	1981	5	7	1	36,549	25	33	0	0	0	3979	19414	0	3892	9264	50	1269	70	150
	T1S R6E 12	1967-1976	1967	25	0	3	22,206	0	6	0	0	0	0	120	0	0	22086	50	25	75	150
	T2N R7E 32	1976-2002	1986	25	1	0	17,723	25	3	0	0	0	0	8882	0	0	8841	50	94	45	145
	T1N R7E 32	1975-1976	1976	5	1	5	10,897	25	10	0	0	0	0	10897	0	0	0	5	208	100	135
	T1S R6E 3	0-0	0	0	4	1	3,140	25	2	0	0	0	0	2248	0	892	0	5	956	100	130
	T1N R6E 35	1961-2007	1990	25	5	3	26,718	25	30	0	0	0	5248	13907	0	0	7563	50	1294	20	120
	T1N R6E 34	1976-2007	1992	10	2	2	9,283	25	8	0	0	0	6971	2312	0	0	0	50	468	35	120
	T1N R6E 11	1973-1973	1973	10	0	0	0	0	1	0	0	0	0	0	0	0	0	5	28	100	115
	T1N R7E 6	1976-2002	1996	25	3	9	30,962	25	22	0	0	0	8223	6588	0	0	16151	50	210	10	110
	T1N R6E 26	1963-1999	1982	5	2	8	14,435	25	13	0	0	0	2408	6587	0	0	5440	50	336	25	105
	T1N R6E 14	1976-1976	1976	25	1	4	9,372	25	1	0	0	0	0	1078	0	0	8294	50	178	5	105
	T1N R6E 12	1968-2002	1989	11	2	4	32,643	25	18	0	0	0	8587	3128	0	0	20928	50	290	10	96
	T1N R7E 16	1976-1976	1976	5	0	1	13,584	25	11	0	0	0	5277	7160	0	1147	0	50	137	15	95
	T1S R6E 1	1967-1995	1975	10	1	1	6,465	0	6	0	0	0	0	4955	0	360	1150	5	397	75	90
	T1S R7E 18	1967-2001	1976	5	0	0	2,068	25	2	0	0	0	0	765	0	608	695	50	25	0	80
	T1N R7E 15	1976-2004	1987	0	0	2	7,803	25	9	0	0	0	3180	4623	0	0	0	50	19	0	75
2	T1N R7E 30	1975-2002	1988	0	0	3	6,658	0	8	0	0	0	0	6658	0	0	0	10	27	45	55
	T1N R6E 13	1981-2000	1990	0	1	1	6,214	25	8	0	0	0	0	1955	0	0	4259	10	530	10	45
	T1N R7E 7	1976-2002	1995	0	0	1	4,032	0	3	0	0	0	0	0	0	0	4032	10	104	35	45
	T1N R7E 34	1979-2004	1990	0	0	1	8,469	0	2	0	0	0	0	8469	0	0	0	0	38	45	45
	T1S R6E 2	1976-1981	1979	5	9	0	6,176	0	4	0	0	0	0	6176	0	0	0	0	679	35	40
	T1N R7E 35	1981-2004	1989	0	4	5	17,993	25	16	0	0	0	400	17593	0	0	0	5	191	10	40
	T2N R6E 34	0-0	0	0	0	2	10,109	0	1	0	0	0	0	0	3693	6416	0	0	23	35	35
	T1N R6E 24	1981-1981	1981	5	0	7	26,853	0	14	0	0	0	0	12324	0	1911	12618	10	270	15	30
	T1N R6E 2	1973-1979	1973	10	1	5	15,750	0	5	0	0	0	0	15750	0	0	0	5	48	5	20
	T1N R7E 5	1976-1976	1976	5	0	4	10,803	0	No Comments	0	0	0	0	2686	0	0	0	5	12	5	15
	T1N R7E 18	1976-2002	1995	0	0	1	4,517	0	13	0	0	0	0	3110	0	782	625	5	98	10	15
	T1N R7E 33	1976-1979	1977	5	0	2	3,701	0	7	0	0	0	0	3701	0	0	0	5	67	5	15
	T1N R6E 22	1977-1980	1977	5	0	7	13,018	0	7	0	0	0	0	13018	0	0	0	5	145	5	15
	T1N R7E 22	1976-2002	1986	0	1	3	5,962	0	6	0	0	0	0	5962	0	0	0	5	111	5	10
	T1N R7E 21	1976-2002	1993	0	0	4	3,805	0	5	0	0	0	0	3805	0	0	0	0	92	10	10
	T2N R7E 31	2002-2002	2002	0	0	5	6,726	0	2	0	0	0	0	2607	0	1546	2573	0	48	0	0

Note: All 96 Square Miles were evaluted, 30 square miles had no mainline, 35 miles had known problems (evaluated above), and 31 miles should be scheduled for replacement based off their depreciation value.

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As shown in the table, the District has considerably more distribution projects than facility projects, requiring considerably more time for completion. It is projected, assuming a pay-as-you-go funding program with $2,000,000 per year, that the District will require approximately 174 years just to complete replacement of the identified undersized conveyance facilities, not including replacement of conveyance facilities that fail as a result of age. Replacement of the remaining age-related conveyance systems is an additional $321,850,000, requiring an additional 161 years at $2,000,000 per year expended. Therefore, at $2,000,000 per year, the entire system is replaced approximately every 335 years. It is typical that water distribution systems require extended periods of time for complete replacement, particularly as distribution system components vary greatly in their useful life. That being said, the District may require additional annual funding to adequately address the distribution system replacement needs, bringing the total replacement.

Combining the expected 25-year annual expenditure of the Water System Facilities and the projected 174-year annual cost of the Water Distribution System, the District would experience a total annual CIP cost of approximately $2,500,000 (escalated over time in accordance with the ENR-CCI index). This annual cost can be decreased by increasing the time period over which the capital assets are replaced. However, is it necessary to plan for a reasonable time period that allows the District to stay ahead of the rate at which existing facilities fail. In this manner, the District can have a regular capital replacement program, at the lowest overall cost and without accumulating a large amount of differed maintenance.

3.3 Prioritized Scheduling

After prioritization, both the water system facilities and water distribution CIP projects were spread over 20 years with a split of $2,000,000 annual expenditure for water distribution projects and $500,000 annual expenditure for water facilities projects. This 20 year schedule is included in Figure 3-1 and Table 3-3.

Figure 3-1. Capital Improvement Plan Annualized Budget

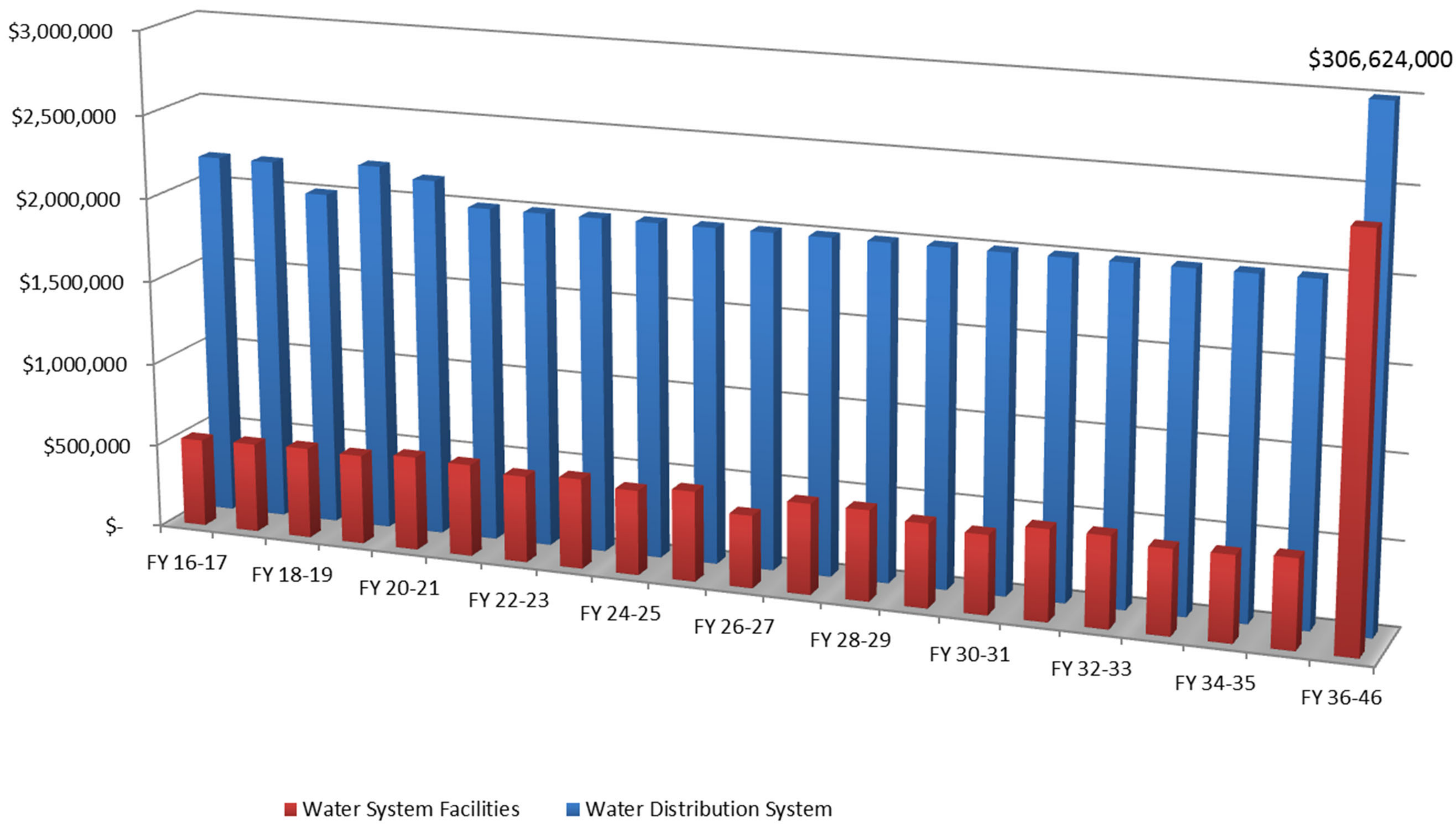

Table 3-3. Projected 20-year Capital Improvement Program

Project No.	Project Name	Priority	Total Cost	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29	FY 29-30	FY 30-31	FY 31-32	FY 32-33	FY 33-34	FY 34-35	FY 35-36	FY 36-46
Water System Facilities																								
CIP 17.2	Well 14 Mech Upgrades	200	$ 210,000	$ 210,000																				
CIP 17.3	Well 14 Elec Upgrades	200	$ 147,000	$ 147,000																				
CIP 11.3	H-1 Booster PS Elec Upgrades	200	$ 173,000	$ 70,000	$ 103,000																			
CIP 11.2	H-1 Booster PS Mech Upgrades	200	$ 197,000	$ 99,000	$ 98,000																			
CIP 12.2	I-1 Booster PS Mech Upgrades	200	$ 248,000		$ 100,000	$ 148,000																		
CIP 12.3	I-1 Booster PS Elec Upgrades	200	$ 153,000		$ 62,000	$ 91,000																		
CIP 13.4	J-1 Booster PS Elec Upgrades	200	$ 147,000		$ 59,000	$ 88,000																		
CIP 13.3	J-1 Booster PS Mech Upgrades	200	$ 228,000		$ 114,000	$ 114,000																		
CIP 3.3	D-1-1-Booster PS Mech Upgrades	160	$ 205,000			$ 103,000	$ 102,000																	
CIP 7.2	K-1 Booster PS Mech Upgrades	160	$ 209,000				$ 157,000	$ 52,000																
CIP 7.3	K-1 Booster PS Elec Upgrades	160	$ 132,000				$ 99,000	$ 33,000																
CIP 8.4	F-1 Booster PS Elec Upgrades	160	$ 153,000				$ 115,000	$ 38,000																
CIP 8.3	F-1 Booster PS Mech Upgrades	160	$ 250,000				$ 63,000	$ 187,000																
CIP 10.4	G-1 Booster PS Elec Upgrades	160	$ 145,000					$ 109,000	$ 36,000															
CIP 10.3	G-1 Booster PS Mech Upgrades	155	$ 285,000					$ 143,000	$ 142,000															
CIP 18.3	Well 15 Elec Upgrades	155	$ 133,000						$ 133,000															
CIP 3.4	D-1-1-Booster PS Elec Upgrades	130	$ 119,000						$ 90,000	$ 29,000														
CIP 16.3	Well 10 Elec Upgrades	115	$ 151,000						$ 151,000															
CIP 1.2	A-1 Tank Road Improv	100	$ 318,000							$ 239,000	$ 79,000													
CIP 3.2	C-2B Site Drainage	100	$ 333,000							$ 250,000	$ 83,000													
CIP 4.1	C-3 Tank Rehab	100	$ 240,000								$ 120,000	$ 120,000												
CIP 5.1	D-3 Tank Rehab	100	$ 88,000								$ 44,000	$ 44,000												
CIP 8.1	D-2-1 Tank Rehab	100	$ 203,000								$ 51,000	$ 152,000												
CIP 4.2	C-3 Tank Road Improv	85	$ 214,000								$ 161,000	$ 53,000												
CIP 5.2	D-3 Tank Road Improv	85	$ 418,000									$ 105,000	$ 209,000	$ 104,000										
CIP 6.2	E-2 Tank Road Improv	85	$ 315,000									$ 32,000	$ 157,500	$ 125,500										
CIP 9.3	E-2-1 Booster PS Elec Upgrades	85	$ 42,000										$ 42,000											
CIP 16.2	Well 10 Mech Upgrades	85	$ 62,000										$ 62,000											
CIP 18.2	Well 15 Mech Upgrades	80	$ 270,000										$ 67,500	$ 202,500										
CIP 3.1	C-2B Tank Rehab	75	$ 2,295,000												$ 459,000	$ 459,000	$ 459,000	$ 459,000	$ 459,000					
CIP 13.2	H-1B Tank Construct	75	$ 829,000																$ 83,000	$ 415,000	$ 331,000			
CIP 8.2	D-2-1 Tank Site Improv	70	$ 161,000												$ 81,000	$ 80,000								
CIP 9.2	E-2-1 Booster PS Mech Upgrades	70	$ 51,000														$ 39,000	$ 12,000						
CIP 1.1	A-1 Tank Rehab	65	$ 169,000																	$ 127,000	$ 42,000			
CIP 2.1	B-1 Tank Rehab	65	$ 532,000																		$ 133,000	$ 399,000		
CIP 6.1	E-2 Tank Rehab	65	$ 147,000																			$ 111,000	$ 36,000	
CIP 9.1	D1-2 Tank Rehab	65	$ 288,000																				$ 216,000	$ 72,000
CIP 10.1	E-1 Tank Rehab	65	$ 182,000																				$ 137,000	$ 45,000
CIP 10.2	E-1 Tank Site Improv	65	$ 130,000																				$ 98,000	$ 32,000
CIP 11.1	F-2 Tank Rehab	65	$ 171,000																				$ 43,000	$ 128,000
CIP 12.1	G-1 Tank Rehab	65	$ 156,000																					$ 156,000
CIP 14.1	I-1 Tank Rehab	65	$ 124,000																					$ 124,000
CIP 14.2	I-1 Tank Site Improv	65	$ 212,000																					$ 212,000
CIP 7.1	K-1 Booster PS Site Improv	60	$ 174,000																					$ 174,000
CIP 16.1	Well 10 Building Upgrades	60	$ 156,000																					$ 156,000
CIP 17.1	Well 14 Building Upgrades	50	$ 184,000																					$ 184,000
CIP 18.1	Well 15 Building Upgrades	50	$ 107,000																					$ 107,000
CIP 19.1	Well 16 Building Upgrades	50	$ 107,000																					$ 107,000
CIP 20.1	Well 17 Building Upgrades	50	$ 239,000																					$ 239,000
CIP 13.1	H-1 Tank Rehab	40	$ 113,000																					$ 113,000
CIP 14.3	I-1B Tank Construct	15	$ 538,000																					$ 538,000
	Water System Facilities Total		$ 12,853,000	$ 526,000	$ 536,000	$ 544,000	$ 536,000	$ 562,000	$ 552,000	$ 518,000	$ 538,000	$ 506,000	$ 538,000	$ 432,000	$ 540,000	$ 539,000	$ 498,000	$ 471,000	$ 542,000	$ 542,000	$ 506,000	$ 510,000	$ 530,000	$ 2,387,000

Project No.	Project Name	Priority	Total Cost	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29	FY 29-30	FY 30-31	FY 31-32	FY 32-33	FY 33-34	FY 34-35	FY 35-36	FY 36-46
Water Distribution System																								
CIP 2.3.1	T2N R7E 32.1	145	$ 2,562,000	$ 1,281,000	$ 1,281,000																			
CIP 2.3.2	T1N R6E 35.1 (Phase 1)	120	$ 2,227,000	$ 891,000	$ 891,000	$ 445,000																		
CIP 2.3.2	T1N R6E 35.2 (Phase 2)	120	$ 2,262,000			$ 1,131,000	$ 1,131,000																	
CIP 2.3.3	T1N R6E 34.1	120	$ 2,134,000			$ 427,000	$ 1,067,000	$ 640,000																
MISC	Pipeline Upsizing Projects (All Locations)							$ 1,500,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 306,624,000
	Water Distribution System Total		$ 9,185,000	$ 2,172,000	$ 2,172,000	$ 2,003,000	$ 2,198,000	$ 2,140,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 306,624,000
	CIP TOTAL			$ 2,698,000	$ 2,708,000	$ 2,547,000	$ 2,734,000	$ 2,702,000	$ 2,552,000	$ 2,518,000	$ 2,538,000	$ 2,506,000	$ 2,538,000	$ 2,432,000	$ 2,540,000	$ 2,539,000	$ 2,498,000	$ 2,471,000	$ 2,542,000	$ 2,542,000	$ 2,506,000	$ 2,510,000	$ 2,530,000	$ 309,011,000

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APPENDIX A

Project Summary Sheets

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APPENDIX B

Planning-Level Cost Opinions

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