



FALLBROOK PUBLIC UTILITY DISTRICT  
MEETING OF THE ENGINEERING AND OPERATIONS COMMITTEE

AGENDA

THURSDAY, APRIL 11, 2019  
8:00 A.M.

FALLBROOK PUBLIC UTILITY DISTRICT  
990 E. MISSION RD., FALLBROOK, CA 92028  
PHONE: (760) 728-1125

*If you have a disability and need an accommodation to participate in the meeting, please call the Secretary at (760) 999-2704 for assistance so the necessary arrangements can be made.*

*Writings that are public records and are distributed during a public meeting are available for public inspection at the meeting if prepared by the local agency or a member of its legislative body or after the meeting if prepared by some other person.*

**I. PRELIMINARY FUNCTIONS**

CALL TO ORDER / ROLL CALL

PUBLIC COMMENT

**II. ACTION / DISCUSSION ----- (ITEMS A – C)**

A. ACQUISITION, IMPLEMENTATION, AND SUPPORT FOR ENTERPRISE ASSET MANAGEMENT

B. UPDATE ON OVERALL DEVELOPMENT OF PIPELINE AND VALVE REPLACEMENT PROGRAM

C. CURRENT PIPELINE AND VALVE REPLACEMENT PROGRAM ANNUAL CAPITAL BUDGET APPROACH

**III. ADJOURNMENT OF MEETING**

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**DECLARATION OF POSTING**


I, Mary Lou West, Secretary of the Board of Directors of the Fallbrook Public Utility District, do hereby declare that I posted a copy of the foregoing agenda in the glass case at the entrance of the District Office located at 990 East Mission Road, Fallbrook, California, at least 72 hours prior to the meeting in accordance with Government Code § 54954.2.

I, Mary Lou West, further declare under penalty of perjury and under the laws of the State of California that the foregoing is true and correct.

April 8, 2018  
Dated / Fallbrook, CA

  
Secretary, Board of Directors

## M E M O

**TO:** Engineering and Operations Committee  
**FROM:** Jason Cavender, Operations Manager   
**DATE:** April 11, 2019  
**SUBJECT:** Acquisition, Implementation, and Support for Cityworks Enterprise Asset Management Software

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Purpose

To discuss replacement of the District's current Computerized Maintenance Management (CMMS) with Cityworks, a more robust Enterprise Asset Management (EAM) system. To evaluate the District's need for outside consulting services for the implementation and on-going support for Cityworks.

Summary

The core function of EAM software is to help manage assets, schedule maintenance, and track and monitor service requests and work orders. This results in a reduction of maintenance costs, improved equipment performance, extended life of cycle of critical assets, and more efficient customer service response. EAM is a critical tool commonly used by utilities to track costs and resources to help improve overall efficiency. Other potential uses for EAM include:

1. Scheduling and planning
2. Asset history recording
3. Provide data for analysis
4. Support Key Performance Indicators (KPIs)
5. Inventory/warehouse management
6. Labor tracking
7. Budgeting

The District currently utilizes Maintenance Connection as its primary preventative maintenance system. Although Maintenance Connection has adequately served its purpose over the last five years, the software is not up to date, has limited functionality, and is mostly paper based. With the recent rehabilitation of the Fallbrook Water Reclamation Plant, and the addition of the Santa Margarita Treatment Plant (SMTP) schedule for 2020, staff has determined that our current processes for maintenance management are labor intensive and inefficient. Additionally, the existing software package does not offer expanded functionality, limiting its use to simple maintenance activities. To more effectively perform, monitor, and track maintenance activities, and to improve our current service request process the District requires a more robust EAM system.

Throughout 2018 District staff has been assessing the need to upgrade to a more powerful and efficient system. As part of the District's evaluation process, staff has worked closely with Valley Center Municipal Water District (VCMWD) to assess our customer service response and asset management needs. VCMWD's maintenance management process is currently paper based, requiring labor intensive documentation and reporting. Because VCMWD and the District are of similar size, and largely operate using similar process and computer applications (GIS, Springbrook, etc.), our EAM and integration needs are very similar. Since November of 2018 both agencies have looked at how EAM is used at other agencies, including Vallecitos MWD, Rainbow MWD, East Valley MWD, and the City of Escondido. The District also had discussions with agencies that have both Springbrook and Cityworks and the system can be integrated when necessary, but it requires some programming to facilitate the integration. A summary of the limitations of the current system compared to the benefits of completing an upgrade to the EAM system is shown in Table 1.

<b>Current Maintenance System</b>	<b>Modern EAM System</b>
Assets stored in a computer database, but work orders are 100% paper based. Requires hand written entry by field crews, and manual entry into database.	Fully computer based. All functions are paperless. Greatly increases work order processing time.
Complex and limited computer interface with no mobile application. Requires significant staff time to update and maintain.	More user friendly interface. Provide overall efficiency improvements once implemented. Reduce staff time associated with managing and updating system.
No integration with other system such as GIS and Springbrook.	Integration with GIS and other software systems. Reduce duplication of data entry.
Maintains records of planned maintenance and documents that maintenance has been performed, but very limited reporting options. Does not provide significant efficiency improvements.	Ability to reduce manual process and improve efficiency of overall operation. Reduce time in receiving, distributing and schedule work orders. Provides detailed reports of maintenance activity and identifies deficiencies.
Low initial cost.	Higher initial cost to implement. Ongoing costs offset by increased efficiency.

**Table 1 – Comparison Current Maintenance System Cityworks EAM system.**

Staff had previously evaluated support from a consultant to help make the EAM product selection. In lieu of this approach staff has worked jointly with VCMWD to make the initial product selection and to evaluate the necessary elements for implementation and support. Through this process both agencies have determined that Cityworks offers the best combination of functionality, user friendliness, and cost. As a result of our mutual effort, both VCMWD and the District have been offered discounted pricing for year one and two. A cost summary and comparison are shown in table 3.

To ensure a timely transition, it is critical that implementation is thorough, efficient, and follows industry best management practices. To do this staff recommends that we use an outside consultant with specialization in this area. An RFP was issued for this service and a selection panel consisting of Todd Jester, GIS Specialist, and Jason Cavender, Operations Manager interviewed three firms. Two firms were determined to be qualified and after a comprehensive qualifications based review of the proposals and interview, the selection committee members recommended award to Black and Veatch.

Black and Veatch has proposed a four month window for initial implementation. The implementation phases are outlined in table 1.

Phase	Summary
Discover	Identify the underlying architecture, data, and work flow process that EAM will support. Conduct on-site workshops and data collection meetings to gather technical data, asset data, workflow details, and reporting needs.
Design	Configure data and develop design using out-of-box templates. Conduct a series of workshops and meetings to identify specific service request and work order needs. Develop service request and work order forms using Cityworks templates.
Deploy	Install software and migrate existing data from GIS and Maintenance Connection. Conduct testing to verify that the configuration is correct. Provide up to five days of on-site training to staff.
As-Needed Support	Identify potential areas of support and development. Assist staff in developing additional functionality (backflow, KPIs, etc.).

**Table 2 – Implementation Phases**

The District will focus on developing and implementing several key aspects of Cityworks, with an overall emphasis on streamlining processes and improving efficiency. Staff recommends prioritizing the following items:

- Priority 1 – Year 1 – Work Orders for preventative maintenance
- Priority 2 – Year 1 – Deploy mobile devices for Work Order and Service Request response
- Priority 3 – Year 1 & 2 – Service Requests for customer service response
- Priority 4 – Year 2 – Service Requests for internal work tasks
- Priority 5 – Year 2 – Develop reports to track Key Performance Indicators (KPI)

Implementation in these areas will replace the existing CMMS system and will add additional functionality that will cover a large part of the field work activities. As full integration with Springbrook would require costly custom programming, these areas have also been selected because they do not require integration with Springbrook.

<b>Cityworks EAM Software</b>	
Annual Cost	Yr. 1 - \$15,000 (discounted) Yr. 2 - \$18,000 (discounted) Yr. 3 - \$20,000 (standard)
<b>Black &amp; Veatch Implementation and Support</b>	
Discover	\$18,185
Design	\$36,160
Deploy	\$25,570
As-needed	\$25,000
<b>Implementation Total</b>	<b>\$104,915</b>
<b>Additional Hardware</b>	
Mobile Devices	Yr. 1 (3) – \$1,500 Yr. 2 (3) – \$1,500
GIS Server Upgrade	\$2,500
<b>Hardware Total</b>	<b>\$5,500</b>

**Table 3 – Cost summary and comparison**

Recommended Action

That the Committee support the recommendations to acquire Cityworks, and to award professional services for EAM implementation and on-going support to Black and Veatch.

MEMO

**TO:** Engineering and Operations Committee  
**FROM:** Jack Bebee, General Manager *ARB*  
 Aaron Cook, Senior Engineer *AC*  
**DATE:** April 11, 2019  
**SUBJECT:** Overall Development of Pipeline and Valve Replacement Program

Purpose

To provide an update to the Committee on the Valve and Pipeline Replacement Program and to provide an overview of alternatives to improve the projections used for the program.

Summary

The District has developed a comprehensive pipeline and valve replacement program. The program was initiated to evaluate the needs to replace pipelines prior to failure to avoid costly property damage and reduce unscheduled outages. The District completed a process using available data to assess long-term funding needs for pipeline replacement. This approach used higher level analysis of pipe age, size and leaks and an overall target of 100 years for replacement to develop an estimate of replacement needs. A summary of the results including the estimated annual capital pipeline and valve investments needs for the next 100 years is shown in Table 1 below.

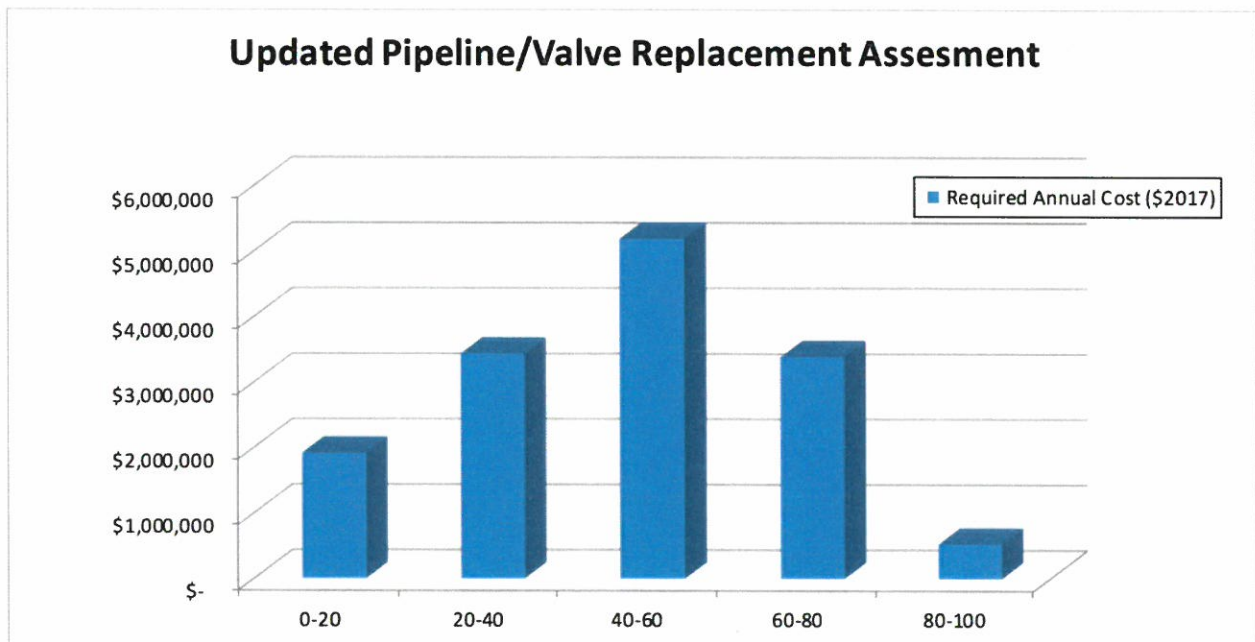
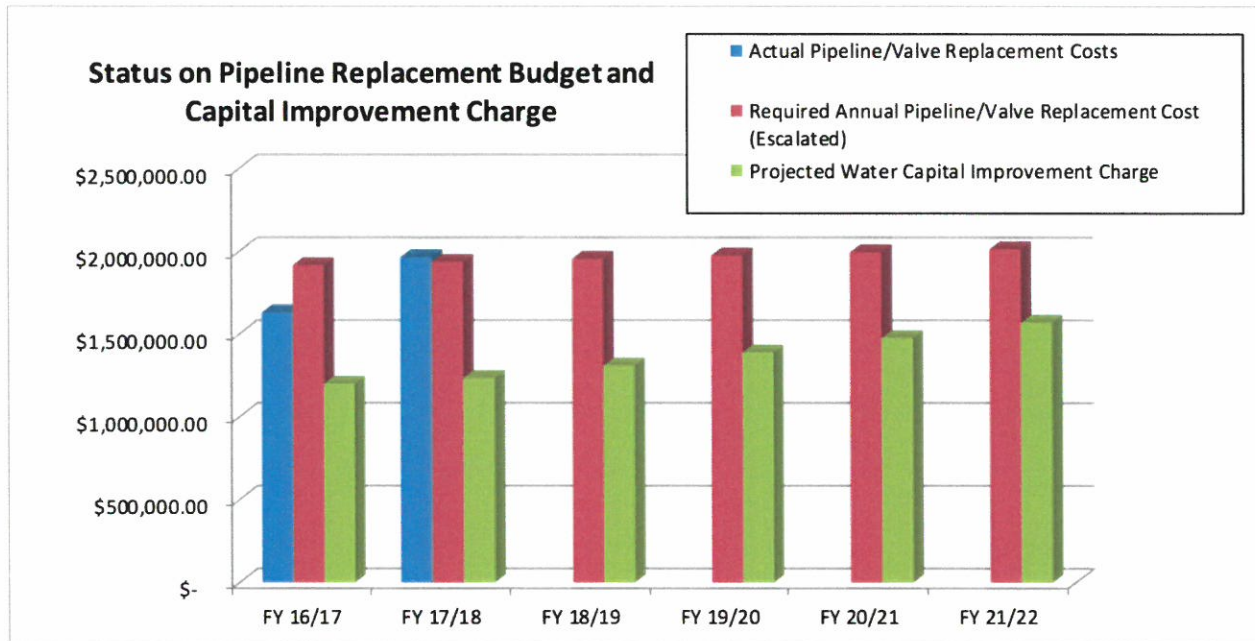


Figure 1 – Estimated Annual Investment Needs Over next 100 years in 20 year increments

The District was able to achieve the target replacement amount for the last Fiscal Year as shown in Table 2. The District replaced \$1,965,109 in buried pipeline and valve infrastructure in the last fiscal year which was right at the target developed from the assessment of \$1.94 million a year. A summary of the past performance compared to the target replacement needs is shown in Table 2.



**Figure 2 – Estimated required replacement investment compared to the capital improvement charge and actual completed replacements.**

The table also shows that a portion of this work is covered by the water capital improvement charge, which is escalated to meet the increasing long-term replacement needs. There are a number of assumptions on pipe age and failures that were used to develop the funding needs and staff has determined that some additional detailed analysis to verify and update the funding needs would be beneficial.

As part of the Board adopted District Strategic Plan under Strategic focus are #2, infrastructure, The District shall complete an update to the asset-management plan to help prioritize projects. This will help ensure lower cost alternatives are evaluated before full replacement of buried infrastructure.

In addition Per Section 21.4 and 21.10.1, staff is required to report back to the Board of Directors on the necessity of the Capital Improvement Charge every five years.

The District has two alternatives to update the projections:

1. Update the projection internally and make some improvements in the projections based on additional cost information.

2. Develop a more detailed projection on replacement needs and impact on the level of service using field data and outside consulting services.

The District can use some additional data to update the projection internally, but does not have the data and models necessary to do a more robust analysis based on specific pipe types and field data on existing pipe materials. The District can also use recent cost data to improve the estimated annual replacement needs.

In order to more robust replacement needs projections, which would provide a statistical analysis on the impact of different spending levels on the expected overall level of service, the District would require the services of outside consultants who specialize in this area and have prepared these estimates for numerous similar utilities to help advance our pipeline replacement needs projection through additional evaluation and testing that will provide a better useful life determination for our pipelines based on actual field data. The goal is to lay a foundation for data-driven assessment that is transparent, sustainable, and cost-effective. In order to complete this goal, an engineering consultant is required to determine the factors (material, pipe wall thickness, pipe type and vintage, pressure, soils, etc.) that drive likelihood of pipe failure and deterioration. With this assessment, the District will be able to better estimate useful life of pipe, prioritize renewal investments, assess possible failure mitigation strategies such as more robust inspection versus replacement, and optimize replacement specifications. The outcome of this approach to help optimize the District Pipeline and Valve replacement programs to help ensure the proper annual investment needed in pipeline and valve replacement.

The effort to complete this effort internally would also not be economical as staff would be re-creating replacement models that have been developed by others.

An RFP was issued for this request on 7/31/2018 to 6 firms and posted on the District's website; two proposals were received. After a comprehensive qualifications based review of both proposals, selection committee members recommended HDR, Inc. for a total of \$151,175.

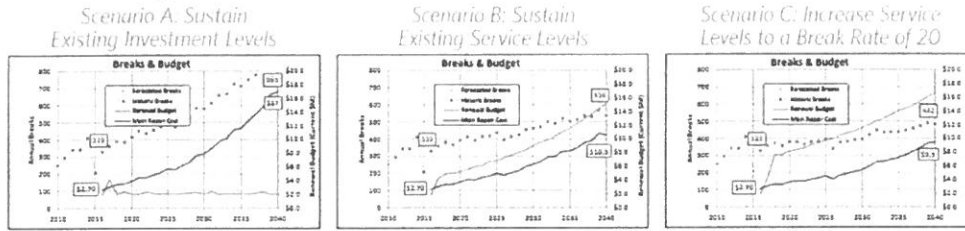
The tasks proposed for this project include:

1. Assessment and Data Clean-up: Review existing program and approach and review data. Utilize established industry approved methodologies to assess the District's current approach.
2. Measure System Deterioration: Use existing District data and data consultant has developed from other agencies to evaluate the current status of the system.
3. Risk Model and Decision Guidelines: Develop an updated risk model based on District data and leverage models and results from past studies by consultant.
4. Benchmarking and Sustainable Budget Scenarios for Inspection and Renewal: Help District review and update proposed renewal, replacement and inspection investment levels and benchmark versus local, state and national benchmarks.

An example of the forecasting scenarios and approach used to establish investment levels is shown in Figure 3 below.



# Resulting Forecast Scenarios



Scenario A is not recommended because service levels are not sustained with this level of investment.

Scenario B is a viable alternative in terms of sustaining current service levels. However, this scenario results in system replacement rates greater than the length

weighted useful life of the overall system (based on Weibull Modeling of asset useful life).

Scenario C is recommended because it is the most cost effective option to sustain service levels (in terms of break rate) and sustain overall system with a replacement

cycle that aligns with the overall system's useful life (based on Weibull useful life modeling). Scenario C is also only modestly more expensive in terms of total annual costs (i.e. total of renewal investments and main break repair costs) than Scenario B in 2040.

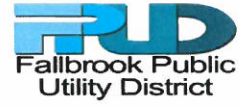
SCENARIO	FUNDING IN 2019	FUNDING INCREASE (ANNUAL)	2040 RENEWAL FUNDING	2040 BREAK RATE	2040 BREAK COUNT	2040 REPLACEMENT CYCLE (YEARS)	2040 MAIN REPAIR COSTS	2040 TOTAL ANNUAL COSTS
A: Sustain Existing Investment Levels	\$2.1M	0%	\$2.1M	36	870	1,271 years	\$17M	\$19M
B: Sustain Existing Service Levels	\$4.9M	5.50%	\$15.2M	22	540	169 years	\$11M	\$26M
C: Break Rate = 20	\$7.3M	3.75%	\$16.6M	20	480	155 years	\$9.5M	\$26M

**Figure 3 – Example of Replacement Investment Scenarios Analysis**

The District budgeted \$150,000 for this assessment in the approved Fiscal Year 2018-19 budget.

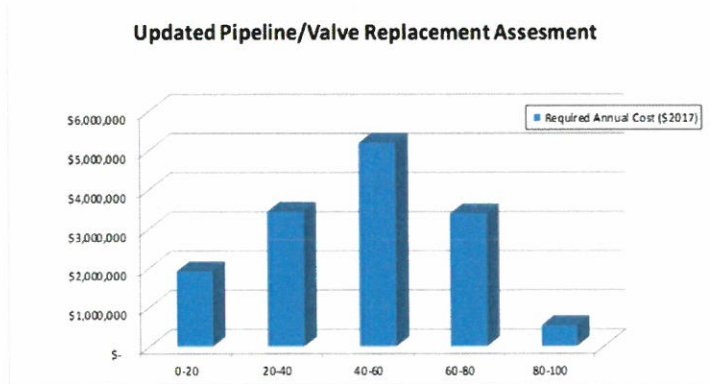
## Recommended Action

That the Engineering and Operations Committee work with staff to develop a preferred approach to recommend to the Board.



# Fallbrook Public Utility District Pipeline and Valve Replacement Program Update April 2019

## Pipeline and Valve Replacement Needs



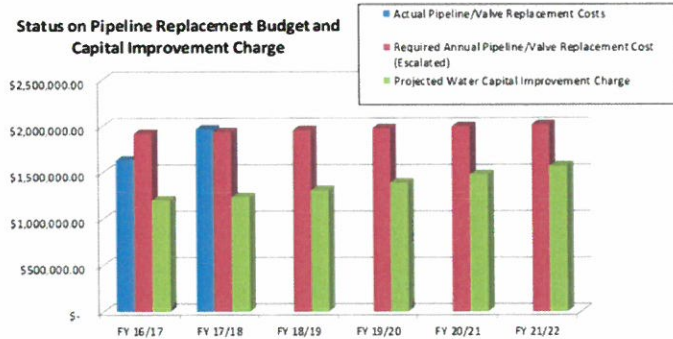
**Estimated Annual Investment Needs Over next 100 years in 20 year increments**

## Pipeline and Valve Replacement Program

### Approach Used to develop current approach

- ▶ **Develop risk based scoring system based on criteria:**  
Establishes priority based on likelihood and impacts of failure
- ▶ **Assumes 100 year lifespan of existing assets:** Groups all pipe types and uses overall average of 100 years
- ▶ **Divide up pipeline projects based on grouping of risk scores into different groups:** Establish groupings based on risk scores, age is not the only determination. Some pipelines must last much longer than average age of 100 years.
- ▶ **Establish Budget needs for each grouping based on unit costs from other projects:** Sets a total annual target amount for replacement. Target is cost based not based on amount of pipeline replaced. Valve costs grouped in with pipeline cost.

## Pipeline and Valve Replacement Performance



Estimated required replacement investment compared to the capital improvement charge and actual completed replacements.

## Limitations of Current Pipeline and Valve Replacement Program Approach

### Approach Used to develop current approach

- ▶ **Develop risk based scoring system based on criteria:**  
Not based on actual field data and details of pipe construction.
- ▶ **Assumes 100 year lifespan of existing assets:**  
Replacement not based on actual type of construction.
- ▶ **Divide up pipeline projects based on grouping of risk scores into different groups: Some pipelines may be planned for replacement at ages not likely feasible.**
- ▶ **Establish Budget needs for each grouping based on unit costs from other projects:** Actual annual need may be higher or lower than necessary based on level of service goals.

## Options

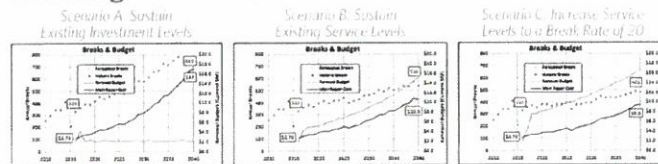
- ▶ Update current approach using additional criteria and update
- ▶ Develop more robust approach using field data and modeling of pipe failure

## Field data and pipe failure modeling approach tasks

- ▶ **Assessment and Data Clean-up:** Review existing program and approach and review data. Utilize established industry approved methodologies to assess the District's current approach.
- ▶ **Measure System Deterioration:** Use existing District data and data consultant has developed from other agencies to evaluate the current status of the system.
- ▶ **Risk Model and Decision Guidelines:** Develop an updated risk model based on District data and leverage models and results from past studies by consultant.
- ▶ **Benchmarking and Sustainable Budget Scenarios for Inspection and Renewal:** Help District review and update proposed renewal, replacement and inspection investment levels and benchmark versus local, state and national benchmarks.

## Example of Study Outcomes

### Resulting Forecast Scenarios



Scenario A is not recommended because service levels are not sustained with this level of investment.

Scenario B is a viable alternative in terms of sustaining current service levels. However, this scenario results in system replacement rates greater than the length

weighted useful life of the overall system (based on Weibull Modeling of asset useful life).

Scenario C is recommended because it is the most cost effective option to sustain service levels (in terms of break rate) and sustain overall system with a replacement

cycle that aligns with the overall system's useful life (based on Weibull useful life modeling). Scenario C is also only modestly more expensive in terms of total annual costs (i.e. total of renewal investments and main break repair costs) than Scenario B in 2040.

SCENARIO	FUNDING IN 2018	FUNDING INCREASE (ANNUAL)	2040 ORIGINAL FUNDING	2040 BREAK RATE	2040 BREAK COUNT	2040 REPLACEMENT CYCLE (YEARS)	2040 MAIN REPAIR COSTS	2040 TOTAL ANNUAL COSTS
A: Sustain Existing Investment Levels	\$2.8M	0%	\$2.8M	36	870	1271 years	\$7M	\$19M
B: Sustain Existing Service Levels	\$4.9M	5.50%	\$15.2M	22	540	169 years	\$11M	\$26M
C: Break Rate = 20	\$7.3M	3.75%	\$16.6M	20	480	155 years	\$9.5M	\$26M

## Why do we need a consultant for pipe failure modeling approach – Why can't we do this ourselves?

- ▶ Consultant has specialized experience in developing industry guidance and best practices for pipeline replacement planning
- ▶ Consultant has existing tools, models and data to help perform assessment.
- ▶ District has limited data in some areas and it is necessary to leverage data from other agencies.

QUESTIONS?

MEMO

**TO:** Engineering and Operations Committee  
**FROM:** Aaron Cook, Senior Engineer *AC*  
**DATE:** April 11, 2019  
**SUBJECT:** Current Pipeline and Valve Replacement Program Annual Capital Budget Approach

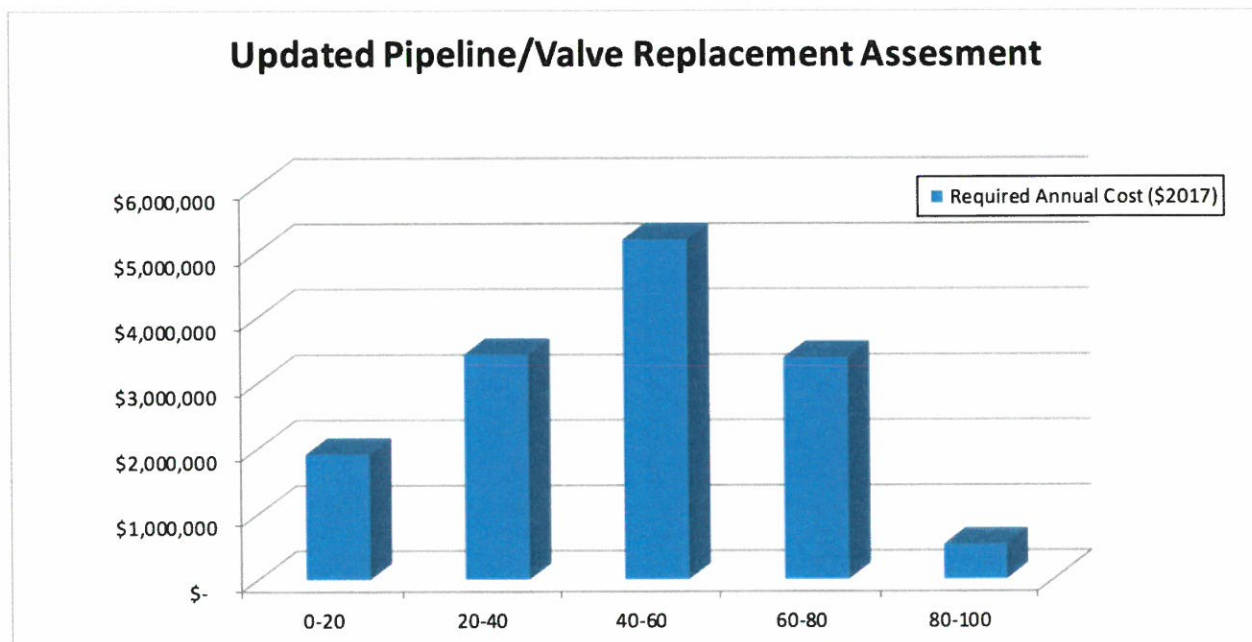
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Purpose

To provide an overview of the current pipeline and valve replacement program annual capital budget approach.

Summary

The District has developed a comprehensive pipeline and valve replacement program. The program was initiated to evaluate the needs to replace pipelines prior to failure to avoid costly property damage and reduce unscheduled outages. The District completed a process using available data to assess long-term funding needs for pipeline replacement. This approach used higher level analysis of pipe age, size and leaks and an overall target of 100 years for replacement to develop an estimate of replacement needs. A summary of the results including the estimated annual capital pipeline and valve investments needs for the next 100 years is shown in Table 1 below.



**Figure 1 – Estimated Annual Investment Needs Over next 100 years in 20 year increments**

As shown, the program is based on a dollar value expended per year. To plan for projects on an annual basis, a running list of pipelines with the most urgent replacement needs is maintained by District staff. This is based principally on historical breaks and pipeline age. Then, estimates of replacement cost for the targeted pipelines are developed. To stay within the planned CIP pipeline replacement expenditure target, projects are selected from this list that are expected to have a combined design and construction cost similar to the overall spending target escalated for cost inflation (~\$2 million per year). As construction costs fluctuate and unexpected conditions are encountered, in some years less pipe will be replaced than anticipated for that year's budget while still keeping up with the planned dollar investment. If projects come in over budget, adjustments are made to other planned projects to stay within the overall budgeted CIP. When the project is awarded, staff would identify other projects that will not be completed if adjustments are required as well as the project cost versus what was anticipated per the Board adopted budget. If the total annual CIP was to need to be increased then the Board would need to approve a change in the CIP spending authorization.

The current planning and estimating process is shown in Table 1 below, with the upcoming fiscal year highlighted.

<u>Location of Project</u>	<u>2017-18</u>	<u>2018-19</u>	<u>2019-20</u>	<u>2020-21</u>	<u>2021-22</u>
Asset Management Plan Update	30,000	100,000	150,000		
<b>Pipe Lines Projects</b>					
<b>Projects to be Completed by District Staff</b>					
Misc Pipeline Replacement	150,000	100,000	100,000	100,000	100,000
Valve Replacements	350,000	400,000	400,000	400,000	400,000
Replace Fire Detector Checks	36,936	40,000	40,000	40,000	40,000
Rebuild Pressure Stations	20,000	20,000			
Design of Pipeline Replacements	25,000	25,000	25,000	25,000	25,000
Mainline leak survey	20,000	20,000	20,000	20,000	20,000
<b>Easement Maintenance</b>					
Easement Rehabilitation	50,000	50,000	50,000	50,000	50,000
<b>TOTAL</b>	<b>681,936</b>	<b>755,000</b>	<b>785,000</b>	<b>635,000</b>	<b>635,000</b>



Location of Project				2017-18	2018-19	2019-20	2020-21	2021-22
		LF	Cost/LF					
1. Old Stage 6" Pipeline Replacement	2018	1000	260			260,000		
2. Pheasant Run 6" Replacement		4,500	170	\$ 765,900				
3. Old Hwy 395 24" Relocation	2018	1,700	278	\$ 471,750	200,000			
4. Santa Margarita at Hilbert to Cemetary 12"		3,400	240		816,000			
5. Deluz Road Dougherty to Patton Oaks		2,120	192		407,888	400,000		
6. Hawthorne at Main and Ivy to Hawthorne Alley		800	170.2					
7. O'hearn S. of Almond 8"		1000	192.4					
8. Alvarado Brandon to Brandenburg 12"		1600	222					
9. Gum Tree Gum Tree Ln to Ridge 20"		3700	800				1,480,000	1,480,000
Gumtree Creek Crossing Realignment 20"		375	950			356,250		
10. Winterhaven Green Canyon to Via Arroyo 12"		1500	222					
11. Hillside Drive Sunset to Portofino 12"		5200	222					
12. Hughes Lane to Clearcrest 12"		1000	222					
13. Via Arroyo Via Rancheros to Adler Creek 12"		1800	222					
14. Winterhaven, Yarnell to Rattlesnake PRV		7400	350					
Winterhaven, Clearcrest to Havencrest 12"		1,820	350			637,000		
Lorenzo Drive 6"		680	250			170,000		
Winterhaven, Havencrest to Sunnycrest 12"		2,650	350				463,750	463,750
<b>TOTAL</b>				<b>1,237,650</b>	<b>1,683,888</b>	<b>1,563,250</b>	<b>1,943,750</b>	<b>1,480,000</b>

**Table 1 – Long Term Pipeline and Valve Replacement Planning**

Recommended Action

This item is for information only. No action is required.