

**REGULAR MEETING AGENDA OF THE  
CUSTOMER ADVISORY COMMITTEE OF  
CITRUS HEIGHTS WATER DISTRICT (CHWD)  
TUESDAY, FEBRUARY 5, 2019 beginning at 6:30 PM**



**CITRUS HEIGHTS COMMUNITY CENTER  
6300 FOUNTAIN SQUARE DRIVE, CITRUS HEIGHTS, CA**

In compliance with the Americans with Disabilities Act, if you have a disability and need a disability-related modification or accommodation to participate in this meeting, please contact the General Manager at (916) 725-6873. Requests must be made as early as possible, and at least one full business day before the start of the meeting.

Customer Advisory Committee meetings are video recorded, and available for web streaming at [www.chwd.org](http://www.chwd.org) and [www.youtube.com](http://www.youtube.com).

**CALL TO ORDER:**

**ROLL CALL OF COMMITTEE MEMBERS:**

**PLEDGE OF ALLEGIANCE:**

**PUBLIC COMMENT:**

The Public shall have the opportunity to directly address the Customer Advisory Committee on any item of interest to the public before or during the Committee's consideration of that item pursuant to Government Code Section 54954.3. Public comment on items of interest within the jurisdiction of the Committee is welcome. The Committee Chair will limit comments to three (3) minutes per speaker.

**REVIEW AND REORDERING OF THE AGENDA:**

Agenda items may be moved to accommodate those in attendance wishing to address that item. Please inform staff at (916) 725-6873 or at [cac@chwd.org](mailto:cac@chwd.org), if you feel that you may need an accommodation.

(A) Action Item

(D) Discussion Item

(I) Information Item

**BUSINESS:**

B-1. Approval of Meeting #3 Summary Including Member Questions and District Answers – December 11, 2018 (A)

B-2. Briefing on Spending and Funding Options (D)

1. Discuss and provide feedback on Technical Memorandum No. 4: Spending and Funding Options.

**COMMITTEE MEMBERS' AND FACILITATOR REPORTS:**

C-1. Facilitator's Report (I)

C-2. Committee Members' Reports (I)

**FUTURE CHWD COMMUNITY ADVISORY COMMITTEE MEETING DATES:**

February 26, 2019    6:30 PM    Regular Meeting

March 19, 2019	6:30 PM	Regular Meeting
June 11, 2019	6:30 PM	Regular Meeting
September 10, 2019	6:30 PM	Regular Meeting

**ADJOURNMENT:**

**CERTIFICATION:**

I do hereby declare and certify that this agenda for this Regular Meeting of the Customer Advisory Committee of the Citrus Heights Water District was posted in a location accessible to the public at the District Administrative Office Building, 6230 Sylvan Road, Citrus Heights, CA 95610 and the Citrus Heights Community Center, 6300 Fountain Square Drive, Citrus Heights, CA 95610 at least 72 hours prior to the regular meeting in accordance with Government Code Section 54954.2.



Christopher Castruita  
Christopher Castruita, Management Services  
Supervisor/Chief Board Clerk

Dated: February 1, 2019



## **Customer Advisory Committee Meeting #3 Summary**

Tuesday, December 11, 2018, 6:30-9:15 pm

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### ***INTRODUCTION***

Jenna Moser, Chair of the Customer Advisory Committee (CAC), called the meeting to order at 6:32 p.m. After welcoming the members of the CAC, she turned the meeting over to Laura Mason-Smith, the CAC meeting facilitator, who reviewed with the CAC the **Meeting Agenda**:

1. Introductions
2. Public Comment
3. Approve minutes of August 28, 2018 CAC Meeting #2
4. Infrastructure Challenges, Main Replacement Findings and Costs, and Basic Financial Considerations
  - a. Review of updated CAC Meeting Schedule for 2019
  - b. Infrastructure Challenges (Technical Memorandum 2)
  - c. Main Replacement Findings and Costs (Technical Memorandum 3)
  - d. Basic Financial Considerations
5. Public Comment
6. Next Steps
7. Close

Laura reiterated that meeting materials are provided electronically to the CAC members in advance of and following their meetings and are posted on the CHWD website, [Customer Advisory Committee Section](#). In addition, meeting summaries that provide an overview of each of the CAC meetings as well as a video of the meetings are posted to the website to be available to the CAC members and the general public.



## Customer Advisory Committee Meeting #3 Summary

Tuesday, December 11, 2018, 6:30-9:15 pm

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### ATTENDEES

#### CAC Members:

Kimberly Berg	Commercial Representative
Julie Beyers	Residential Representative
Ray Bohlke	Residential Representative
Deborah Cartwright	Residential Representative
Patti Catalano	Residential Representative
Jon Jacobs	Representing Wes Ervin, Commercial Representative
Michael Goble	Residential Representative
Suzanne Guthrie	Residential Representative
Doug MacTaggart	Residential Representative
Dave Mitchell	Institutional Representative
James Monteton	Residential Representative
Richard Moore	Residential Representative
Jenna Moser	Residential Representative and CAC Chair
Richard Moses	Residential Representative
Mike Nishimura	Commercial Representative
Aimee Pfaff	Residential Representative
Peg Pinard	Residential Representative
Cyndi Price	Institutional Representative
Ray Riehle	CHWD Director
Javed Siddiqui	Residential Representative

#### Not in Attendance:

Katherine Cooley	Institutional Representative
David Paige	Residential Representative
Chris Ralston	Institutional Representative
Noe Villa	Institutional Representative

#### CAC Alternates:

Bren Martinez  
Andrew Johnson

#### CHWD Staff:

Chris Castruita	Management Services Supervisor/Chief Board Clerk
Tamar Dawson	Assistant Engineer
David Gordon	Operations Manager
Madeline Henry	Management Services Specialist/Deputy Board Clerk
Rex Meurer	Water Efficiency Supervisor
Missy Pieri	Engineering Manager/District Engineer
Susan Sohal	Administrative Services Manager
Hilary Straus	General Manager
Paul Dietrich	Project Manager

#### Consultants:

Roger Kohne	Harris & Associates
Andrew MacDonald	Harris & Associates
Habib Isaac	Raftelis Financial Consultants, Inc.
Laura Mason-Smith	Mason-Smith Success Strategies



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### ***PUBLIC COMMENT***

There was no public comment.

### ***APPROVAL OF AUGUST 28, 2018, CAC MEETING #1 MINUTES***

CAC Member Suzanne Guthrie motioned to approve the August 28, 2018 minutes. The motion was seconded by CAC Member Patti Catalano. The minutes of the August 28, 2018, CAC Meeting #2 were unanimously approved without comments or changes.

### ***INFRASTRUCTURE CHALLENGES, MAIN REPLACEMENT FINDINGS AND COSTS, AND BASIC FINANCIAL CONSIDERATIONS***

CHWD Engineering Manager/District Engineer and Project 2030 Project Manager Missy Pieri outlined the updated 2019 CAC Meeting Schedule and encouraged all CAC members to note the CAC Meeting dates on their calendars. To continue to build shared understanding among the CAC members, District Engineer Pieri outlined the Project 2030 Scope as well as those Project 2030 "Building Blocks" that were part of the evening's Meeting topics (please see the CHWD Website section on Project 2030 CAC Meeting #3 for the slide presentation detail).

#### **Infrastructure Challenges, Technical Memorandum #2**

Andrew MacDonald, Harris & Associates, reviewed and explained infrastructure challenges (what makes water main replacement challenging), supply challenges, and regulatory challenges, all of which are important Building Blocks for the Water Main Replacement Study.

#### **Main Replacement Findings and Costs, Technical Memorandum #3**

- Roger Kohne, Harris & Associates, reviewed another important Building Block, main replacement risk analysis findings, including:
  - How the risk-based approach will be used,
  - Summary of risk analyses for main replacements, and
  - Risk factors and their relative weighting.
  
- Andrew MacDonald reviewed the key components of water main replacement cost estimates, another Building Block for the Water Main Replacement Study:
  - Replacement cost estimates,



## **Customer Advisory Committee Meeting #3 Summary**

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- Total pipeline replacement costs, and
- Spending over various phasing time periods.
- CAC members identified questions about the Technical Memorandums #2 and #3 which were answered by the District Staff and Consultants later in the Meeting.

### **Basic Financial Considerations**

- Habib Isaac, Raftelis Financial Consultants, Inc, provided an overview of:
  - Citrus Heights Water District's capital costs,
  - How spending and funding options become alternatives,
  - Funding 101—the process for developing a funding strategy for Water Main Replacement,
  - Debt financing,
  - Spending and funding metrics, and
  - Next steps.
- CAC members identified additional questions about the Basic Financial Considerations which were then answered by the District Staff and Consultants (please see the summary of questions and answers below).

### **CAC MEMBER QUESTIONS AND DISTRICT ANSWERS**

Q1: Is there peer analysis for the Study?

A1: *The District is reaching out to neighboring water districts on issues of mutual/related concern (e.g., future water demand projections and coordinating pipe purchases) and for both formal and informal reviews related to the Project 2030 Study.*

Q2: Are the replacement costs projected based on 2030 supply, or do they project for future cost increases?

A2: *The costs are in 2018 dollars for now. However, the financial model will account for adjustments based on proposed year of spending. In future meetings, inflation will be addressed as part of the revised cost estimates.*

Q3: Has the District looked at any correlation between where the pipes break and why? More referencing newer pipes?

A3: The District does try and determine why a pipe breaks every time a leak is identified. This data is inputted into the District's maintenance management software for history and analysis. For the purposes of the Project 2030 Study, pipe break data was considered and given a small weighting factor within the Risk Analysis software model since there was not a significant amount of pipe break data available. Analysis of pipe break data will continue to be analyzed during the implementation phase at the operational level, after the Project 2030 Study is complete. It is expected that the District



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will update the Risk Analysis model including the various weighting factors at regular intervals (e.g., annual, 5-years) to ensure the model reflects current conditions.

Q4: Have you factored in inflation?

A4: *Inflation was not included in the initial cost estimate presented on December 11, 2018. However, the financial model will account for adjustments based on the proposed year of spending and as described above the various options presented in future meetings will include inflation-adjusted costs.*

Q5: This is a lot of pipe for only \$540 million.

A5: *\$540 million would be the cost to replace the entire distribution system, if we had to do so tomorrow. It is understood that approximately two-thirds to three-quarters of the District's pipes (to be determined with the CAC) will need to be replaced as part of Project 2030. Therefore cost estimates will be revised to reflect options and inflation factors associated with each option.*

Q6: Will there be increased District costs (i.e., new employees, etc.)?

A6: *Yes, there will be increased District operation and overhead costs. These costs were included in the cost projections and could be a combination of new employees and external resources.*

Q7: Knowing that other districts have already been through this, how do your educated guesses as far as weighting hold up?

A7: *The District is at the forefront of looking at this in this detailed of a manner. Most Districts do asset management, and some do weighting to determine which is more important. A lot of surrounding Districts have not taken this rigorous of an approach yet. One agency that is using this tool, East Bay Municipal Utility District, serves a much larger service area and are doing an extensive amount of work and scientific research on water main breaks. They are using a much higher weighting (30%) vs. our (10%) on breaks. Each water agency is unique and need to determine their own weighting factors.*

Q8: Do you expect to continue the \$20 million per decade repairs?

A8: *Yes, the District currently has budgeted \$2 million per year for pipeline replacement up to the year 2030. The District's financial model will be updated based on the outcomes of the Project 2030 Study.*

Q9: Has there been any research into a different delivery system instead of in the roadways?

A9: *After the Project 2030 Study, during the design phase of each project, the District will look at the best location for each pipeline installation (e.g., under sidewalks or under roads). Putting water mains in road ways has been a common practice due to right-of-way and easy accessibility, however there are cost considerations to keep in mind (e.g., pavement replacement or traffic control). Some of the District's water mains are located on private property which makes them difficult to repair and replace. For those private*



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*property locations, the goal will be to move them into the public right-of-way where feasible.*

- Q10: Can we figure a dollar cost for failures, factoring time, type of failure, location?  
A10: *The District hasn't determined a dollar cost for a failure, as each failure is unique. Failures can be very expensive depending on where they are located. Failures are typically a lot more expensive than replacing the pipeline. The District's goal is to replace the water mains before there are significant failures.*
- Q11: Did the District set aside replacement funds in past years?  
A11: *We do have reserve accounts--the Capital Improvement Project reserve. We have these funds set aside in our financial model up to the year 2030. However, as has been highlighted in the Project 2030 Study, significant costs are ahead and funding strategies need to be identified. While funds are currently being set aside, additional funding will be needed to reduce or eliminate debt financing for the replacement of what will be a significant number of water mains that will age-out after the year 2030.*
- Q12: Have there been any studies about how the pipes are laid in order to minimize breaks?  
A12: *There is a lot of research with recommendations on pipeline installation (e.g., depth to bury, pipe bedding, the amount of traffic and weight loads, and how much you can deflect a pipe to keep it as strong as possible). We will look into any possible studies to see how we can reduce breaks, looking at approaches to pipeline installation.*
- Q13: How will the District pay for the increases? Are there Federal grants to help pay for pipe replacement?  
A13: *There are grants primarily for recycle and reuse but not typically for repair and replacement. Repair and replacement costs are more of a local obligation. The District will explore all possible non-rate-based funding options.*
- Q14: Will some of the property taxes that the City will be receiving in 2022 be available to help fund Project 2030?  
A14: *CHWD is an Irrigation District under state law and does not receive property tax or other sources of funding that cities receive.*
- Q15: Will funding options include the percentage of rate increases/revenues required?  
A15: *Any funding option, other than "do nothing", will likely include projected rate increases tied to pay-as-you-go, debt financing, or both. These funds would be set aside into their own account (designated reserve for water main replacements). These reserves are typically invested in the California Local Agency Investment Fund (LAIF), which currently generates an annual rate of return of approximately 2%.*



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- Q16: How will decreased water use (income decreases) affect this?  
A16: *With conservation there will be a reduction in the revenue received by the District, because a portion of the District's rate remains volumetric, tied to customer's usage.*
- Q17: When prefunding, is that money in an interest bearing account? Where does it get invested, and with what kind of return?  
A17: *Yes it would be set aside in its own account (designated reserve for water main replacements). These reserves are typically invested in the California Local Agency Investment Fund (LAIF), which currently generates an annual rate of return of approximately 2%.*
- Q18: Based on historical experience, is there a target percentage water districts have increased their rates that was acceptable by the community?  
A18: *There is not a standard accepted amount as the circumstances and objectives of each agency vary based upon individual needs.*
- Q19: Our community will not be able to rely on development to offset costs, so what are others' experiences in figuring out distribution of costs?  
A19: *The District is substantially built-out, and the infrastructure costs are related to repair and replacement as opposed to accommodating new growth. Even if there is land for development on the horizon, the District would not recommend assuming the new homes / units be part of funding projections because they may not materialize, causing a funding shortfall for Project 2030 financial planning.*
- Q20: When communities are not forecasting revenue increases tied to development, what has been your experience with how they handle it? What has worked, what hasn't?  
A20: *Typically local funding, which is primarily rate-based funding is utilized to fund infrastructure replacements. The rates can support either debt financing, pay-as-you-go, or both.*
- Q21: Are there cameras or videos to see inside the water main lines?  
A21: *Cameras or video inspection have been used to inspect water mains but are more widely used on sewer lines as sewer lines are non-pressurized and require less preparation to perform an inspection. Video inspection for water mains generally requires the water main to be shut down and dewatered, access ports for camera insertion to be installed, and chlorination and repressurization of the water main to put it back in service. There are other types of water main inspection techniques that are non-invasive (e.g. visual, electromagnetic, ultrasonic). The District will develop an implementation plan with the Project 2030 Study that will include recommendations for water main inspections.*



**PROJECT 2030**  
WATER MAIN REPLACEMENT



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Q22: How will CHWD coordinate with the city or county?

A22: *The District routinely checks with the City, County, and other regional agencies to coordinate water main projects and other infrastructure projects within and around our service area.*

Q23: What are the most vulnerable parts of the water mains after the creek crossings? (Missy)

A23: *While there are different opinions on this, the District finds that water mains located on private property are the most vulnerable.*

Q24: When will the \$540 million funding will be gathered by?

A24: The timing for revenue and costs needs will be determined by the CAC and presented through various options.

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## **Customer Advisory Committee Meeting #3 Summary**

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### ***CAC PROCESS AND LOGISTICS OVERVIEW***

The CAC reviewed the updated schedule of 2019 CAC Meetings). The meetings shown below are planning to be after-dinner meetings and the high-level topics for each meeting are listed below.

<b>Workshop #4: February 5, 2019, 6:30-9:15 pm, Citrus Heights Community Center</b>
Options for Spending Options for Funding Spending/Funding Alternatives
<b>Workshop #5: February 26, 2019, 6:30-9:15 pm, Citrus Heights Community Center</b>
<ul style="list-style-type: none"><li>• Analysis of the Pros and Cons of the Spending/Funding Alternatives</li><li>• Selection of up to 4 Spending/Funding Alternatives</li></ul>
<b>Workshop #6: March 19, 2019, 6:30-9:15 pm, Citrus Heights Community Center</b>
<ul style="list-style-type: none"><li>• Market Research Primer</li><li>• Review the Pros and Cons of the Spending/Funding Alternatives</li><li>• Selection of up to 2 Spending/Funding Alternatives for Market Research</li></ul>
<b>Workshop #7: June 11, 2019, 6:30-9:15 pm, Citrus Heights Community Center</b>
<ul style="list-style-type: none"><li>• Market Research Results</li><li>• Develop Final Recommendation to the Board</li><li>• Steps for Implementation Plan</li></ul>
<b>Workshop #8: September 10, 2019, 6:30-9:15 pm, Citrus Heights Community Center</b>
<ul style="list-style-type: none"><li>• Review Implementation</li><li>• Review Final Board Recommendation</li></ul>



## **Customer Advisory Committee Meeting #3 Summary**

Tuesday, December 11, 2018, 6:30-9:15 pm

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### **CAC MEMBER COMMENTS**

The CAC members indicated what they were taking away from the Meeting as:

1. I so appreciate the amount of work and effort by the District to do this
2. I appreciate that we're doing this now instead of later
3. There is an amazing amount of information the staff is putting out, and I thank them for this
4. I've learned a tremendous amount
5. All of this is starting to come together
6. Still processing all of the information and options, look forward to future meetings.
7. There are so many uncertainties, especially when dealing with the pipes on private property
8. This is what I expected; we're getting more and more details
9. I'm interested to learn more about the ranking possibilities
10. This is really dependent on the construction timeline
11. It is very interesting to look at when we replace the big pipes
12. There are lots of moving parts
13. We're all going to learn a lot
14. I'm looking forward to the financial piece
15. Some things are getting clearer and clearer
16. There are great opportunities now to reroute certain pipes
17. It will be interesting to see how we will handle this with an aging population, both for us and for future generations
18. I am really fascinated with the impressive process; it is really good
19. It would be helpful to get the Technical Memorandums sooner to be able to review the material we are considering
20. I look forward to reviewing the alternatives and funding options
21. It is very interesting that we are an irrigation district, and how we compare with cities and other districts
22. Pipe life expectancy versus survival probability is very interesting; I'd like to dig into this even more
23. This is a very informative process, and more information is being filled in
24. I look forward to the financial discussions
25. It will be important to think about how we'll be able to get the public involved before any rate increases
26. I have a realization of the depth and gravity of this vital issue
27. We all have a stake in this
28. This is scarier than Jaws, but we need to look at this now, and we can solve these problems
29. We have the best water in the world
30. I appreciate everyone for volunteering their time and for the staff providing the information and visuals



**PROJECT 2030**  
WATER MAIN REPLACEMENT



## **Customer Advisory Committee Meeting #3 Summary**

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### ***PUBLIC COMMENTS***

None

### ***CLOSE***

CAC Chair Jenna Moser thanked the CAC members and District staff and consultants for their participation and adjourned the meeting at 9:15 p.m.

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# CITRUS HEIGHTS WATER DISTRICT

## DISTRICT STAFF REPORT TO CUSTOMER ADVISORY COMMITTEE OF CITRUS HEIGHTS WATER DISTRICT FEBRUARY 5, 2019 REGULAR MEETING

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SUBJECT : BRIEFING ON SPENDING AND FUNDING OPTIONS  
STATUS : Action Item  
REPORT DATE : February 1, 2019  
PREPARED BY : Missy Pieri, Engineering Manager/District Engineer

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### **OBJECTIVE:**

1. Discuss and provide feedback on Technical Memorandum No. 4: Spending and Funding Options.

### **BACKGROUND AND ANALYSIS:**

At the October 18, 2017 Board Meeting, the Citrus Heights Water District (CHWD) Board of Directors approved the Professional Services Agreement with Harris & Associates for the Project 2030 Water Main Replacement Study (Study).

The building blocks of the Study include:

- Asset Inventory
- Water Demand Forecast
- Water Main Replacement and Costs
- Water Main Replacement Phasing Plan
- Funding Strategy/Rate Options Analysis
- Implementation Plan
- Market Research on the final 2 options.

At Customer Advisory Committee (CAC) meeting #2, held on August 28, 2018, the Project Team provided a briefing on the Water Demand Forecast, summarized in Technical Memorandum No. 1: Water Demand Forecast. This memo considers key assumptions such as population change, land development, legislative/regulatory mandates and other factors that could impact future District-wide water usage. The water demands will be used to determine future water main sizes that are proposed to be replaced and will assist in the prioritization of water main replacements.

At CAC meeting #3, held on December 11, 2018, the Project Team provided a briefing on the Infrastructure Challenges, summarized in Technical Memorandum No. 2: Infrastructure Challenges (Technical Memo No. 2) and Water Main Assessment summarized in Technical Memorandum No. 3: Water Main Assessment (Technical Memo No. 3).

Technical Memo No. 2 identifies the infrastructure challenges, water supply challenges, and regulatory challenges that will likely impact the replacement of water mains beginning in 2030 and beyond.

Technical Memo No. 3 summarizes the key assumptions and methodology used to create the water main assessment and replacement cost estimates. This information will serve as the foundation for developing water main replacement phasing options and associated funding strategies.

At the CAC meeting #4, to be held on February 5, 2019, Technical Memorandum No. 4: Spending and Funding Options (Technical Memo No. 4) will be presented.

Technical Memo No. 4 identifies various Spending and Funding Options and analyzes twenty-one (21) unique Spending and Funding Alternatives. The key considerations used to evaluate each Alternative include, but are not limited to, the amount of water main replaced, revenue adjustments and fluctuations, and pipe survival probability/relative risk.

At the February 5 meeting, staff will review each of the 21 unique Spending and Funding Alternatives with the CAC, and request feedback on both Technical Memo No. 4 and the Alternatives presented. The input will be used by staff to refine the Alternatives and, where agreed, will be incorporated into the final version of Technical Memo No. 4. Staff will bring back these Alternatives at the next several CAC meetings to analyze the key considerations and have the CAC narrow down from 21 to 2 or 3 Alternatives. These 2 or 3 Alternatives will then be market researched and the data will be presented at the June CAC meeting for analysis and discussion.

**RECOMMENDATION**

Provide input and feedback to be included in the Project 2030 Study Technical Memorandum No. 4: Spending and Funding Options.

**ATTACHMENTS:**

Technical Memorandum No. 4: Spending and Funding Options

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# Technical Memorandum No. 4 Spending and Funding Options

## Project 2030 Water Main Replacement

February 2019

Prepared for:



**PROJECT 2030**  
WATER MAIN REPLACEMENT



6230 Sylvan Road  
Citrus Heights, CA 95610

Prepared by:

(Spending)



**Harris & Associates**

(Funding)



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- Figure 9. Alternative 3.1: \$200M – 2x Baseline (No Prefunding and No Debt)
- Figure 10. Alternative 3.2: \$200M – 2x Baseline (Prefunding with No Debt)
- Figure 11. Alternative 4.1: \$320M – (No Prefunding and No Debt)
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- Figure 19. Alternative 6.1: \$480M – (No Prefunding and No Debt)
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- Figure 26. Alternative 7.4: \$510M – (Prefunding with Debt)

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Table 1. Water Main Replacement Metrics for Various Survival Probabilities

Table 2. Spending Options

Table 3. Baseline

Table 4. Alternative 2.1: 1.5x Baseline (No Prefunding and No Debt)

Table 5. Alternative 2.2: 1.5x Baseline (Prefunding with No Debt)

Table 6. Alternative 3.1: \$200M – 2x Baseline (No Prefunding and No Debt)

Table 7. Alternative 3.2: \$200M – 2x Baseline (Prefunding with No Debt)

Table 8. Alternative 4.1: \$320M – (No Prefunding and No Debt)

Table 9. Alternative 4.2: \$320M – (Prefunding with No Debt)

Table 10. Alternative 4.3: \$320M – (No Prefunding with Debt)

Table 11. Alternative 4.4: \$320M – (Prefunding with Debt)

Table 12. Alternative 5.1: \$390M – (No Prefunding and No Debt)

Table 13. Alternative 5.2: \$390M – (Prefunding with No Debt)

Table 14. Alternative 5.3: \$390M – (No Prefunding with Debt)

Table 15. Alternative 5.4: \$390M – (Prefunding with Debt)

Table 16. Alternative 6.1: \$480M – (No Prefunding and No Debt)

Table 17. Alternative 6.2: \$480M – (Prefunding with No Debt)

Table 18. Alternative 6.3: \$480M – (No Prefunding with Debt)

Table 19. Alternative 6.4: \$480M – (Prefunding with Debt)

Table 20. Alternative 7.1: \$510M – (No Prefunding and No Debt)

Table 21. Alternative 7.2: \$510M – (Prefunding with No Debt)

Table 22. Alternative 7.3: \$510M – (No Prefunding with Debt)

Table 23. Alternative 7.4: \$510M – (Prefunding with Debt)

## EXECUTIVE SUMMARY

This memorandum (Memo) summarizes the methodology on how various spending and funding options including rate revenue, pre-funding, debt, and a combination of the three were developed. By combining these various spending and funding options, a total of twenty-one (21) unique spending and funding alternatives were developed. These 21 alternatives will be analyzed and key considerations of the various alternatives will be discussed.

### SPENDING

The Citrus Heights Water District (CHWD or District) currently spends approximately \$2 million annually on water main replacement, which equates to an annual rate of replacement of less than 0.5%. As water mains age throughout the District, the likelihood of failure increases. Through the Project 2030 Study (Study), the District is evaluating various spending options to update its replacement program.

Seven (7) different levels of spending between the years 2030 and 2080 have been developed. The first spending option is to remain at current spending levels, \$2 million annually (in 2018 dollars). This spending option represents the highest relative risk. The other bookend of the spending options is a \$10.2 million annual rate of spending (in 2018 dollars). This represents the lowest relative risk as 94 percent of the water mains would be replaced by the year 2080.

### FUNDING

The Citrus Heights Water District is currently reviewing the replacement of the utility's water mains, which will commence in 2030 and span decades to complete. This endeavor requires significant capital spending to achieve the full replacement of all water mains and development of a Long-Term Financial Plan (LTFP) which will assist the District to determine the most viable options available to consider for funding The Study. There are many ways to fund ongoing capital needs, which include pay-as-you-go (PAYGO), debt financing, grants (when available), and advance funding by appropriating available funds today for future needs. When developing a comprehensive financial plan for a utility, reviewing the agency's long-term capital plan is a critical component to ensure revenue needs of the utility over the long-term are part of what's considered when setting rates in the short-term.

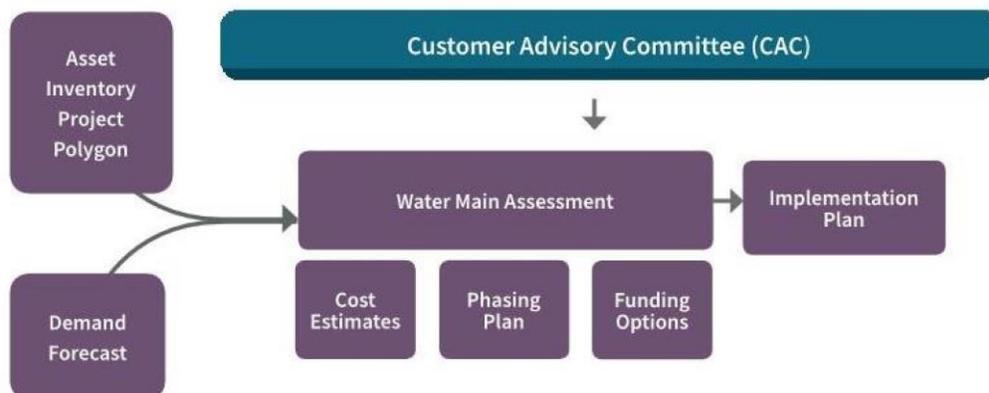
When determining available funding options for the 7 different levels of spending, certain spending options include multiple funding options by including prefunding, debt financing, or both. As such, as the spending levels increase between spending options, up to four funding options are considered for review and comparison. Through the review and comparison of each spending/funding Alternative, the relative risk of the water system will vary based on level of reinvestment and the revenue requirements to achieve the water main reinvestment will impact the level of revenue increases, amount of debt incurred, and how setting aside funding now may mitigate and smooth out revenue increases over the project schedule. Each of the 21 alternatives are listed separately with a brief summary, specific metrics and key considerations.

### NEXT STEPS

Through upcoming workshops, the District will evaluate the 21 different spending and funding alternatives and compare the key considerations of each. Through a series of Customer Advisory Committee (CAC) meetings, these 21 alternatives will be winnowed down to the top two (2) or three (3) alternatives. A market research firm will then conduct a hybrid internet and telephone survey of 500 District customers and property owners of the top 2 or 3 alternatives to provide additional input to the District and CAC members. With this information and through workshops, the District will develop an implementation plan to recommend to the District's Board of Directors for discussion and possible action.

## INTRODUCTION

Renewal and replacement of infrastructure, funding of improvements and public understanding of the value of water are key issues to water system managers. The District is currently using a 30-year Capital Improvement Plan (Plan) that was developed in 1998 as a key planning tool in determining annual capital improvement projects, which includes water main replacement. As the above Plan is nearing the end of its term, the District is undertaking a process to review and refine its long term water main replacement program, which the District titled Project 2030 - Water Main Replacement Study (Study). Key elements of this Study include: 1) Asset Inventory and Project Polygon Development, 2) Water Demand Forecast, 3) Water Main Assessment, 4) Phasing Plan, 5) Cost Estimates, 6) Funding Options, including Water Rate Options and Debt Service Options, and 7) Implementation Plan (see Figure 1).



**Figure 1. Water Main Replacement Study**

This memorandum (Memo) summarizes the methodology on how various spending and funding options including rate revenue, pre-funding, debt, and a combination of the three (item 6 above) were developed. By combining these various spending and funding options, a total of twenty-one (21) unique spending and funding alternatives were developed. These 21 alternatives will be analyzed and key considerations of the various alternatives will be discussed.

This memorandum will be incorporated into the Final Project 2030 Plan.

## ASSUMPTIONS

Below is a summary of the assumptions that were made for the spending and funding of the Study.

- All total and average annual spending costs in this section are expressed in 2018 dollars. This allows a meaningful comparison to current practices. In addition, total spending when expressed in 2018 dollars reflects a present construction value, which in turn represents a physical quantity of water main replacement, and therefore allows these values to be compared directly.
- Construction cost escalation (inflation) will be factored into the funding options analysis.
- The planning period for all of the spending and funding options is expressed over a 50-year planning period.
- An inflation rate of 3.2% was incorporated in all funding options, based on a 20-year average of the construction cost index.
- For debt financing, a 30-year term at 5% interest was used.

## CURRENT MAIN REPLACEMENT PRACTICE

The District currently spends approximately \$2 million annually on water main replacement. This equates to an annual rate of replacement of less than 0.5%. Currently, this rate of replacement is

sufficient since water mains are still in good condition; however, it is expected most of the District’s water mains will require replacement over the next 60-years since the majority of the District’s water mains were installed during the development boom from 1960 through the mid 1980’s. Since the life of a water main ranges from 70 – 100 years, it is expected that starting in the year 2030 these water mains will need to be replaced.

## METHODOLOGY

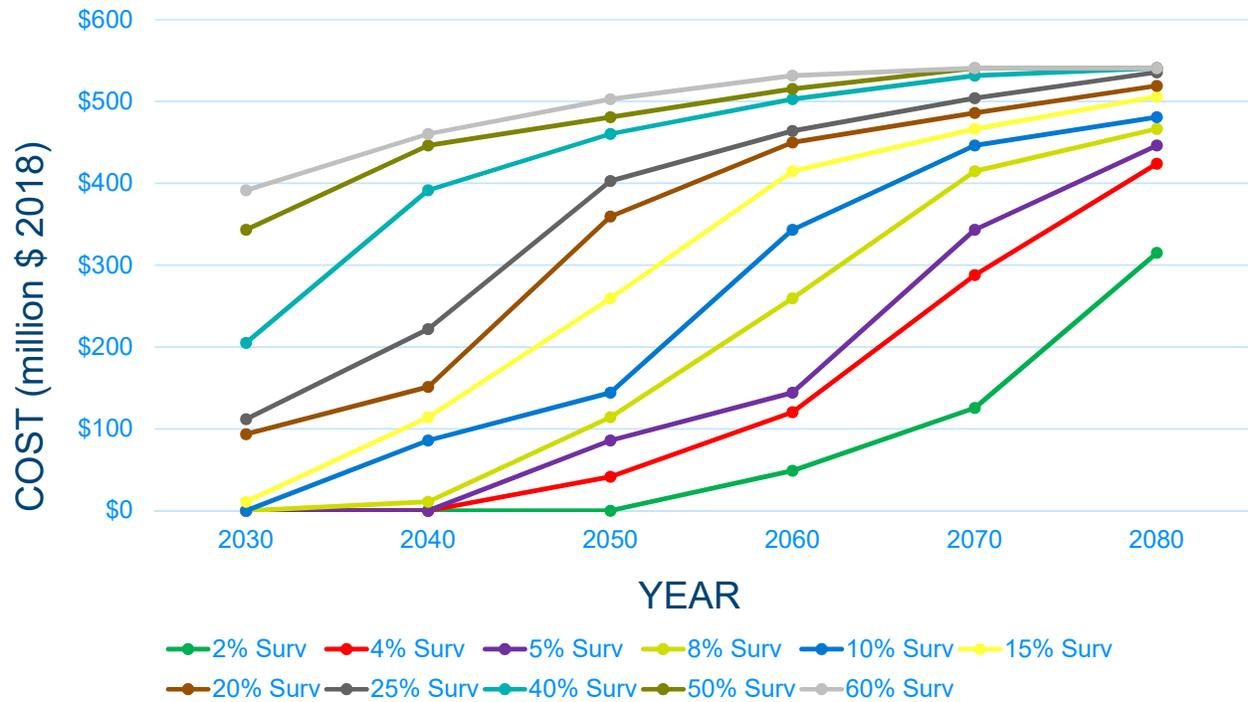
The Likelihood of Failure (LOF) factor for Pipe Age/Survival Probability (LOF #1, 50% weighting factor) was used as the primary tool to develop relative risk of different spending options. Survival Probability is defined as the likelihood that a pipe won’t experience a “failure”. The Survival Probability was determined using risk analysis software called InfoMaster by Innovyze. Survival Probabilities (SP) in the year 2080 (50-year Project Period) and relative risk are shown in Table 1. The lower the Survival Probability, the higher the likelihood of failure. Conversely, the higher the Survival Probability, the lower the likelihood of failure. The 2% Survival Probability is the Highest Risk of all curves; however, it is important to note the Survival Probability varies over the 50-year period as shown in Figure 1.

The Survival Probability curves along with the Relative Risk and Cost will be used to evaluate and compare the various spending options.

**Table 1. Water Main Replacement Metrics for Various Survival Probabilities**

<b>Water Main Replacement by 2080</b>	<b>Relative Risk</b>	<b>Miles of Water Main Replaced through 2080</b>	<b>Cost (2018 \$)</b>	<b>Incremental Cost (from row above)</b>
2% Survival Probability	Highest	143	\$315M	N/A
4% Survival Probability	Medium	195	\$424M	\$108M
5% Survival Probability	Medium	207	\$446M	\$22M
8% Survival Probability	Medium Low	216	\$466M	\$20M
10% Survival Probability	Medium Low	223	\$480M	\$14M
15% Survival Probability	Low	233	\$506M	\$25M
20% Survival Probability	Very Low	239	\$519M	\$13M
25% Survival Probability	Very Low	247	\$535M	\$16M
Total System Replacement	Lowest	250	\$540M	\$5M

Figure 1.5 Survival Probability Spending Curves



## SPENDING OPTIONS

The spending options that will be evaluated are presented in Table 2. All spending options are assumed to begin in the year 2030 and span over a 50-year period.

Each spending option is presented along with the percent of the water system that would be replaced and the approximate survival probability of the system in the years 2040, 2060, and 2080. The District's current annual water main replacement rate of \$2.0 million is included in the Spending Options as Option 1 and also named "Baseline". This Baseline option accounts for increased operational costs, other annual repair and replacement projects, and reserve funding, but does not include the planned meter replacement project.

**Table 2. Spending Options**

Spending Option Name	Average Annual Spending (2018 \$)	Total Spending by 2080 (2018 \$)	Percent of system replaced in 2080	Approx. Survival Probability in 2040	Approx. Survival Probability in 2060	Approx. Survival Probability in 2080
Option 1 (Baseline)	\$2.0M	\$100M	18%	7.8%	2.1%	less than 1%
Option 2 (1.5x Baseline)	\$3.0M	\$150M	28%	7.9%	2.4%	1.0%
Option 3 (2x Baseline)	\$4.0M	\$200M	37%	8.1%	3.9%	1.4%
Option 4	\$6.4M	\$320M	59%	9.4%	6.4%	2.1%
Option 5	\$7.8M	\$390M	72%	9.6%	7.3%	3.1%
Option 6	\$9.6M	\$480M	89%	11.2%	8.2%	10.0%
Option 7	\$10.2M	\$510M	94%	12.1%	8.6%	16.5%

## FUNDING INTRODUCTION

Funding a Water Agency's Capital Improvement Plan (CIP) is a significant driver to the overall financial health of the utility. Agencies that adequately fund their repair and replacement needs on an annual basis are typically able to mitigate high rate increases and may gradually adjust rates to keep up with inflation. Conversely, agencies that do not fully fund their depreciating assets are more susceptible to higher construction costs resulting from fixing capital needs through a reactive approach and failures occur. As such, rate increases could spike in certain years as capital costs fluctuate with more variance from year-to-year.

## FUNDING OPTIONS

There are many ways to fund ongoing capital needs, which include pay-as-you-go (PAYGO), debt financing, grants (when available), and advance funding by appropriating available funds today for future needs (Prefund). When developing a comprehensive financial plan for a utility, reviewing the agency's long-term capital plan is a critical component to ensure revenue needs of the utility over the long-term are part of what's considered when setting rates in the short-term. Doing so allows a more measured approach with revenue adjustments while minimizing a substantial increase in one particular year.

In this Study, the Citrus Heights Water District (District) will review the replacement of the utility's water mains, which will commence in 2030 and span decades to complete. This endeavor requires significant capital spending to achieve the full replacement of all water mains and the District is reviewing various funding options for the Study. The Study's capital costs are above and beyond current operations, existing debt and already scheduled capital. As part of the funding, the District is considering the impacts of issuing debt and how slowly increasing rates today can assist with offsetting costs from 2030 and beyond.

As described in the Spending Options Section, there are seven (7) different spending options which range from limited funding equal to \$2M per year, based on what is currently set aside for water main line replacement, up to \$510M with an annual spending amount of \$10.2M per year. For consistency, each of the spending options span a 50-year time period with a commencement date of 2030.

When reviewing the funding options available for each spending option, one spending option could have up to four (4) alternative ways to fund the total project. These available funding options, include whether debt will be utilized and if the District will start prefunding the project today or wait until the project actually starts before adjusting revenue and corresponding rates. As such, funding alternatives include: 1) No Prefunding and no Debt, 2) Prefunding without Debt, 3) No Prefunding with Debt, and 4) Prefunding with Debt. Each funding alternatives will also include rate funding on a PAYGO basis. Figures 2-5 provides an illustration of how the various funding options may be applied to a specific spending option.

Figure 2.



Figure 3.

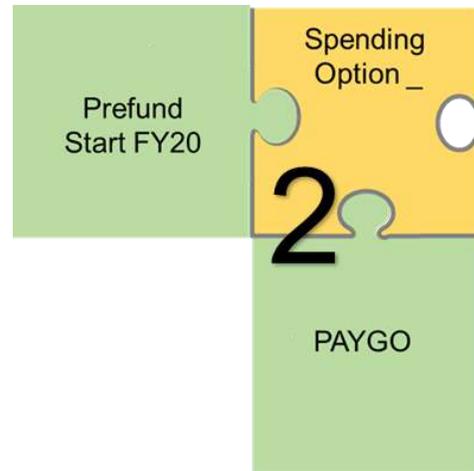


Figure 4.

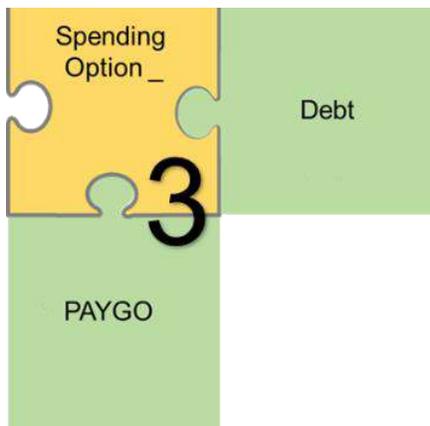
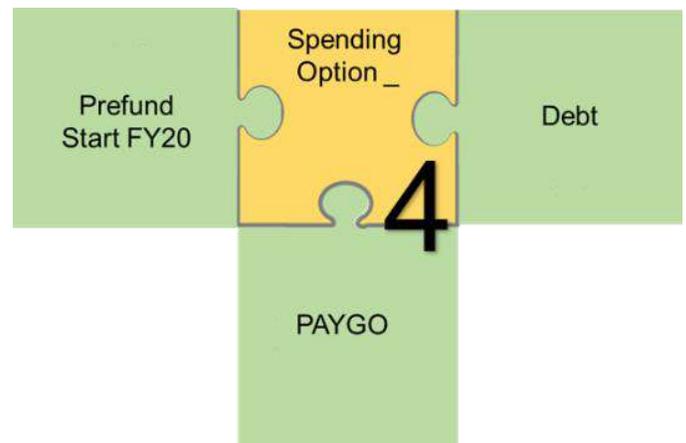


Figure 5.



## SPENDING AND FUNDING ALTERNATIVES

Through the selection of whether prefunding and debt financing will be incorporated as part of the funding for each spending option, 21 unique spending/funding alternatives were generated to review and consider. Each of the 21 alternatives are summarized and attached hereto as Exhibit A and includes the average rate increases necessary to meet the Study revenue requirements. Although our analysis extends through the project completion of 2080, it is important to note that revenue adjustments and setting corresponding rates are typically limited to no more than the next five (5) years and notices are required to be mailed to all customers pursuant to the provisions of Proposition 218. In addition, there are many independent variables that could impact the long-term forecast of each alternative, including, but not limited to: 1) new requirements and mandates from the State, 2) increases to costs outside District control, such as, purchased water and SMUD electricity charges. 3) water quality and increased treatment requirements, 4) drought emergencies, 5) population growth, 6) behavioral changes to consumption trends, and 7) technology efficiencies.

Below is a summary of each alternative which describes water main replacement investment including other obligations included as part of Baseline. See Exhibit A for a detailed summary.

**Alternative 1: Baseline Funding**

When evaluating a District’s current financial position and future revenue needs, a long-term financial plan must be developed to account for all District expenses, including annual costs related to water supply, labor, power, materials, capital expenditures, operating and maintenance (O&M) expenses, reserve contributions, depreciation, and existing and proposed debt service payments. The resulting forecast reflect the District’s expected revenue requirements over the planning horizon based on what is known today. Projecting revenue adjustments over a long planning horizon can illustrate future rate impacts and potential challenges to the District’s financial situation. This will allow the District to adjust its capital project scheduling to smooth rate impacts while maintaining financial stability and adequate levels of reserves.

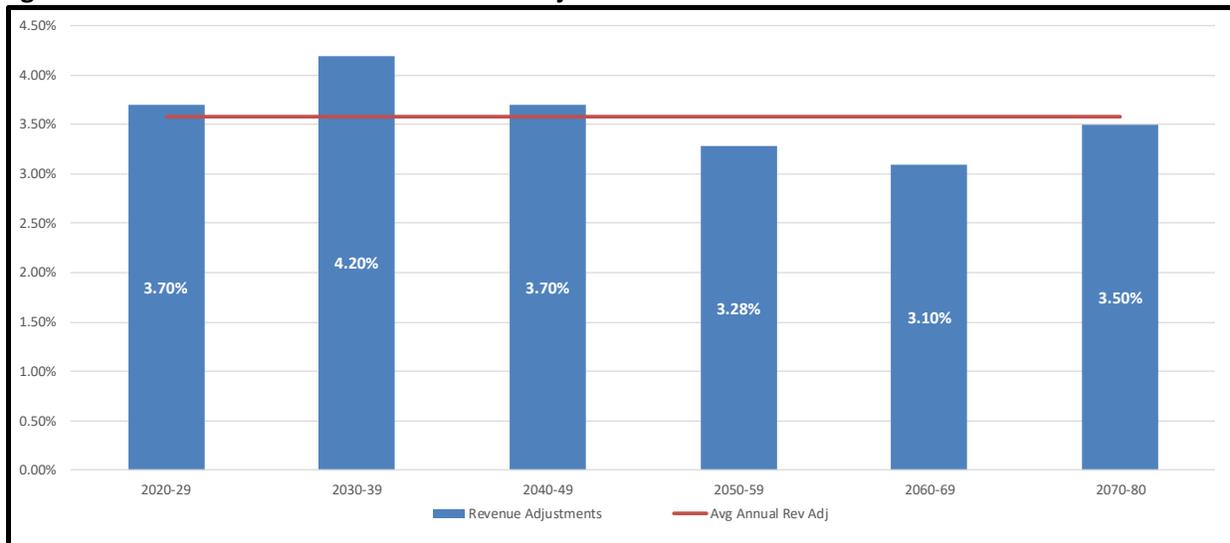


Before incorporating various spending options for the Study, the District’s existing revenue requirements were modeled to generate a baseline level of funding needed based on the District’s current budgetary expenses, planned capital, and reserve funding. With this multi-year cash flow analysis, anticipated revenue adjustments over the planning period were determined, while minimizing rate fluctuations. The Baseline Financial Plan requires an average annual revenue adjustment through 2080 of 3.58%, with a recommended adjustment of 3.7% for FY 2020 through FY 2029. The Baseline Alternative does not take into account prefunding or any debt. Table 3 provides a summary of the Baseline financial plan with key metrics in relation to the Study and Figure 6 identifies the expected revenue adjustments between 2020 through 2080.

**Table 3. Baseline**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$100M	18%	less than 1%	3.58%	No	N/A

**Figure 6. Alternative 1 - Baseline Revenue Adjustments**



**Key Considerations:**

- Reflects current water main repair and replacement investment.
- Replaces 18% of the water main system by 2080.
- Minimum reinvestment generates a low survival probability with inherent high relative risk.

### **Alternative 2.1: \$150M – 1.5x Baseline (No Prefunding and No Debt)**

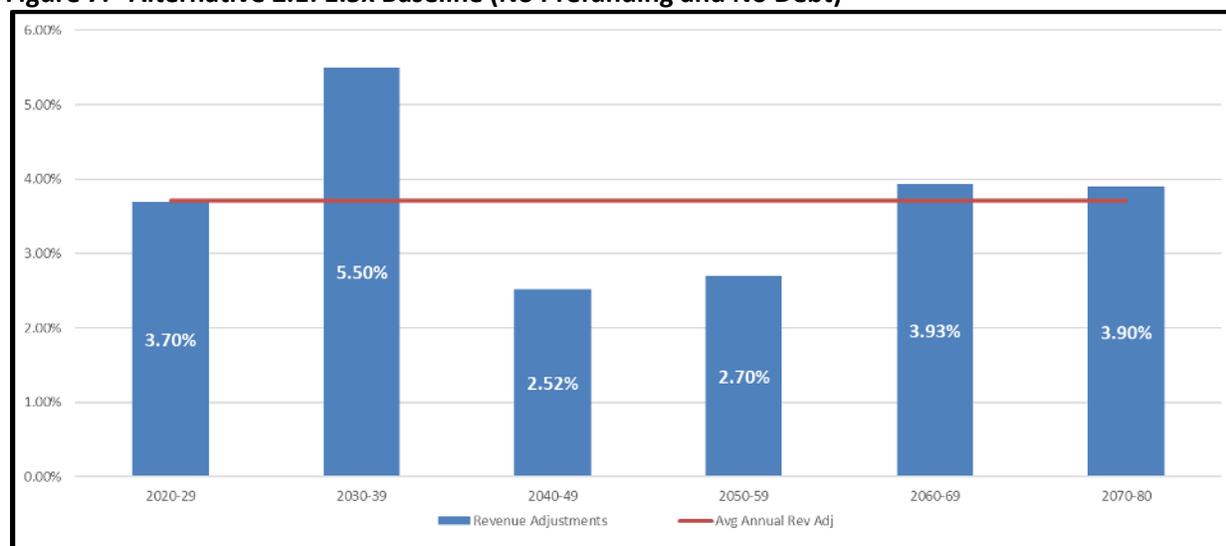


Alternative 2.1 slightly increases the reinvestment of water main replacement commencing in 2030 from \$2M per year in 2018 dollars up to \$3M a year in 2018 dollars and does not take into account prefunding or debt. With this level of spending, a slight increase in revenue would be required between 2030 and 2080 when compared to baseline since no prefunding is used in this alternative. When an Alternative does not include prefunding, revenue adjustments between FY 2020 and FY 2029 will be equivalent to the Baseline adjustments during that period which is equal to 3.7%. Table 4 provides a summary of Alternative 2.1 financial plan with key metrics in relation to the Study and Figure 7 identifies the expected revenue adjustments between 2020 through 2080.

**Table 4. Alternative 2.1: 1.5x Baseline (No Prefunding and No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$150M	28%	1%	3.71%	No	No

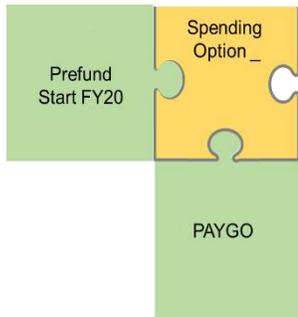
**Figure 7. Alternative 2.1: 1.5x Baseline (No Prefunding and No Debt)**



#### **Key Considerations:**

- No prefunding requires higher revenue adjustments between 2030-2039.
- Revenue adjustments fluctuate due to ramping up in early years of project.
- 10% more water main replacement when compared to Baseline.
- Survival probability is low with level of reinvestment, generating a high relative risk.

**Alternative 2.2: \$150M – 1.5x Baseline (Prefunding with No Debt)**

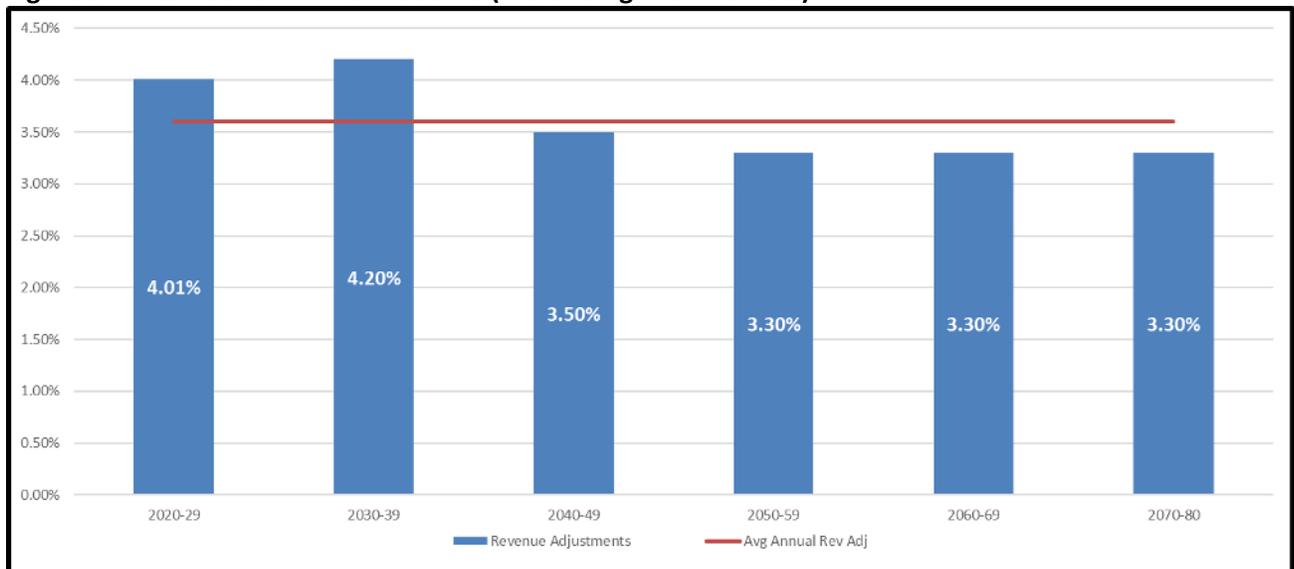


Alternative 2.2 is the same as Alternative 2.1, but with prefunding included. Prefunding permits a smoothing of future required revenue adjustments by building up funding in advance of the project without the need to ratchet up funding during the first year of project commencement. Therefore, Alternative 2.2 slightly increases revenue during FY 2020 through FY 2029 up to 4.01%, while mitigating the proposed increases in Alternative 2.1 during the first 10 years of the project down to 4.20%. Table 5 provides a summary of Alternative 2.2 financial plan with key metrics in relation to The Study and Figure 8 identifies the expected revenue adjustments between 2020 through 2080.

**Table 5. Alternative 2.2: 1.5x Baseline (Prefunding with No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
<b>Baseline</b>	\$150M	28%	1%	3.60%	No	<b>Yes</b>

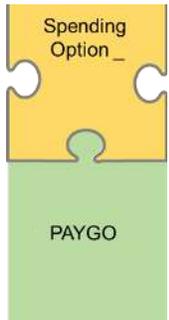
**Figure 8. Alternative 2.2: 1.5x Baseline (Prefunding with No Debt)**



**Key Considerations:**

- Prefunding reduces higher revenue adjustments between 2030-2039.
- Overall annual revenue adjustments over project duration equals 3.60%.
- 10% more water main replacement when compared to Baseline while difference in average annual revenue adjustments is 0.02%.
- Survival probability is low with level of reinvestment, generating a high relative risk.

**Alternative 3.1: \$200M – 2x Baseline (No Prefunding and No Debt)**

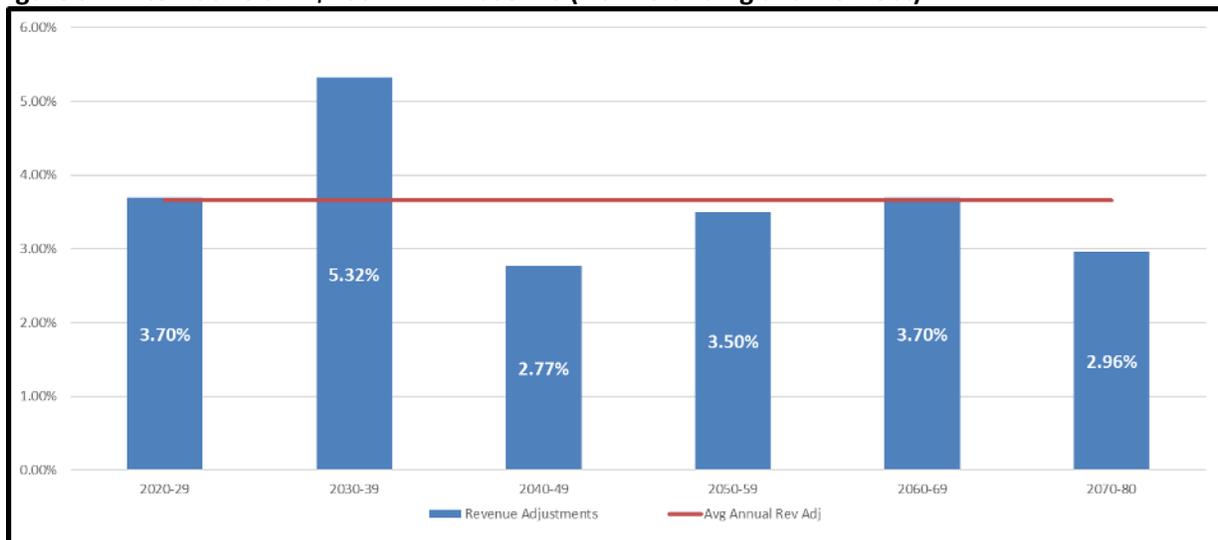


Alternative 3.1 doubles the current reinvestment of water main replacement commencing in 2030 from \$2M per year in 2018 dollars up to \$4M a year in 2018 dollars. With this level of spending, higher increases are needed when no prefunding is included as additional funding for the project starts when the project commences. As such, revenue adjustments between FY 2020 and FY 2029 are equivalent to the Baseline adjustments equal to 3.7% and a spike in funding is required equal to 5.32% each year between FY 2030 and FY 2039. However, due to cashflow needs and ensuring adequate District reserves remain intact, 9% revenue adjustments are required for the first three years of the project between FY 2030 and FY 2032. Table 6 provides a summary of Alternative 3.1 financial plan with key metrics in relation to the Study and Figure 9 identifies the expected revenue adjustments between 2020 through 2080.

**Table 6. Alternative 3.1: \$200M – 2x Baseline (No Prefunding and No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$200M	37%	1.4%	3.66%	No	No

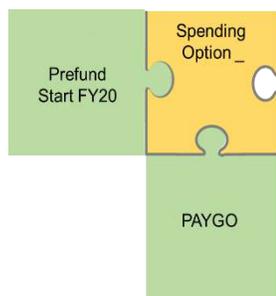
**Figure 9. Alternative 3.1: \$200M – 2x Baseline (No Prefunding and No Debt)**



**Key Considerations:**

- No prefunding requires a spike in revenue adjustments between 2030-2039.
- 9% increases in FY 2030, FY 2031 and FY 2032
- Revenue adjustments fluctuate due to ramping up in early years of project.
- Approximately 20% more water main replacement when compared to Baseline.
- Survival probability is low with level of reinvestment, generating a high relative risk.

### **Alternative 3.2: \$200M – 2x Baseline (Prefunding with No Debt)**

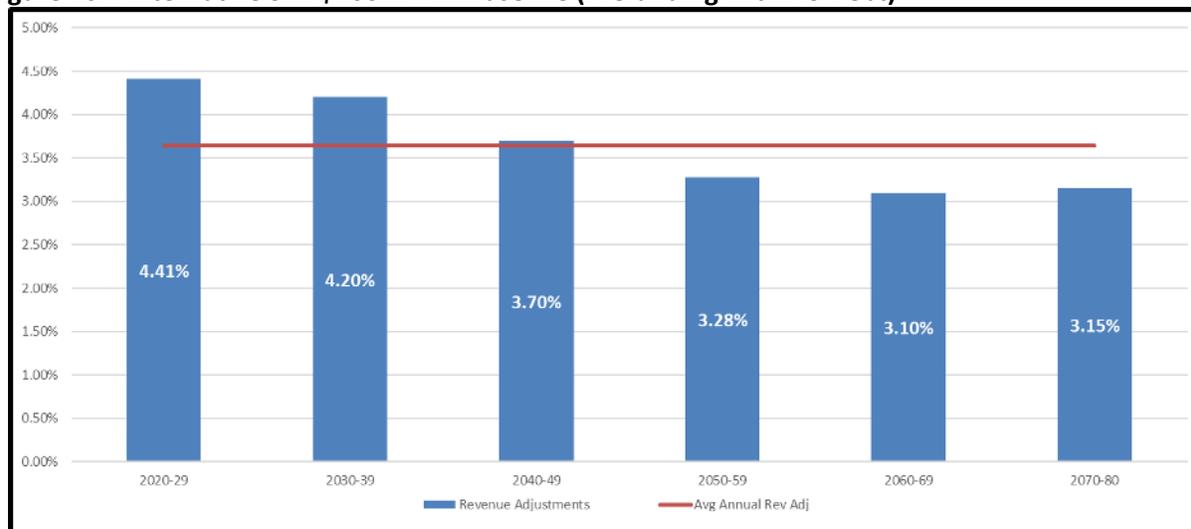


Alternative 3.2 is the same as Alternative 3.1, but with prefunding included. With slightly higher revenue adjustments in advance of the project during FY 2020 through FY 2029 of 4.41% annually, the projected revenue adjustments during the first 10 years of the project can be reduced to 4.20%. Table 7 provides a summary of Alternative 3.2 financial plan with key metrics in relation to the Study and Figure 10 identifies the expected revenue adjustments between 2020 through 2080.

**Table 7. Alternative 3.2: \$200M – 2x Baseline (Prefunding with No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
<b>Baseline</b>	\$150M	28%	1%	3.64%	No	<b>Yes</b>

**Figure 10. Alternative 3.2: \$200M – 2x Baseline (Prefunding with No Debt)**



#### **Key Considerations:**

- Prefunding smooths out required revenue adjustments between 2030-2039.
- Revenue adjustments are also more leveled throughout project.
- Approximately 20% more water main replacement when compared to Baseline.
- Survival probability is low with level of reinvestment, generating a high relative risk.

**Alternative 4.1: \$320M – (No Prefunding and No Debt)**

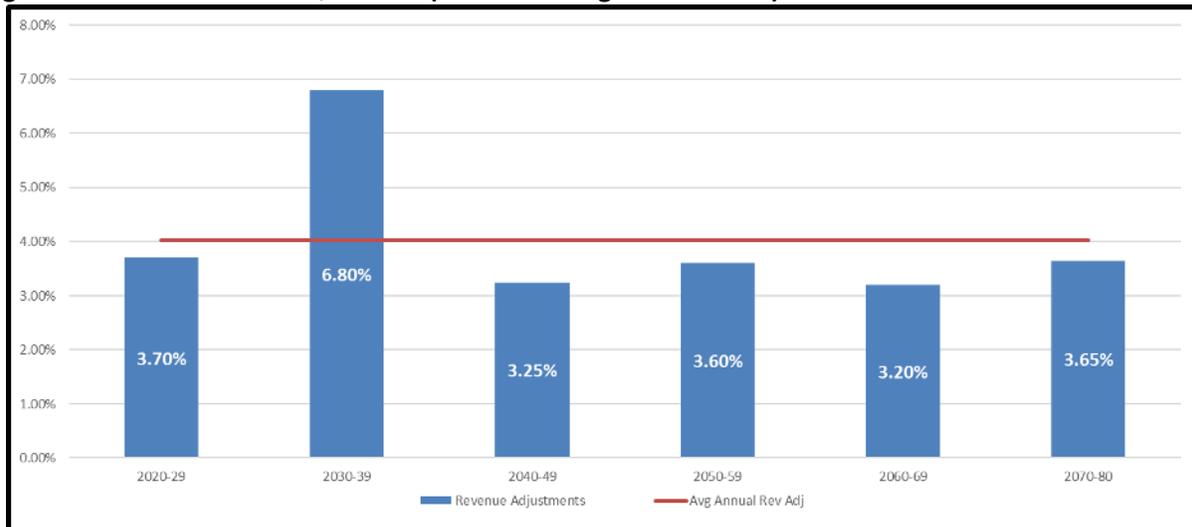


Alternative 4.1 increases reinvestment to main line replacement up to \$320M, resulting in annual spending equal to \$6.4M in 2018 dollars. With Alternative 4.1, prefunding and debt are not included. Therefore, steeper increases are necessary to ramp up funding at the start of the project in 2030, equal to 6.8% revenue adjustments year-over-year. In addition, due to cashflow needs and maintaining adequate District reserves, a 50% revenue adjustment is required in FY 2030. Overall, the average annual rate increase through project completion at 4.03% is not much higher than Alternatives 3.1 and 3.2; but the revenue spike in FY 2030 would cause significant rate shock to customers. Table 8 provides a summary of Alternative 4.1 financial plan with key metrics in relation to the Study and Figure 11 identifies the expected revenue adjustments between 2020 through 2080.

**Table 8. Alternative 4.1: \$320M – (No Prefunding and No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	4.03%	No	No

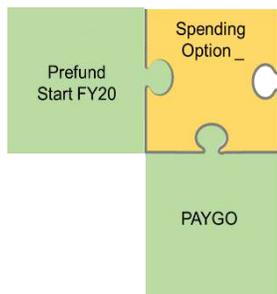
**Figure 11. Alternative 4.1: \$320M – (No Prefunding and No Debt)**



**Key Considerations:**

- No prefunding requires higher revenue adjustments between 2030-2039.
- 50% increase in required in FY 2030 to meet spending needs.
- Future increases from FY 2040 and beyond average 3.43% due to the ramp up in revenue during the first 10 years of construction.
- Revenue needs generate inter-generational inequity
- Revenue adjustments fluctuate due to ramping up in early years of project.
- More than 50% of water mains replaced.

### Alternative 4.2: \$320M – (Prefunding with No Debt)

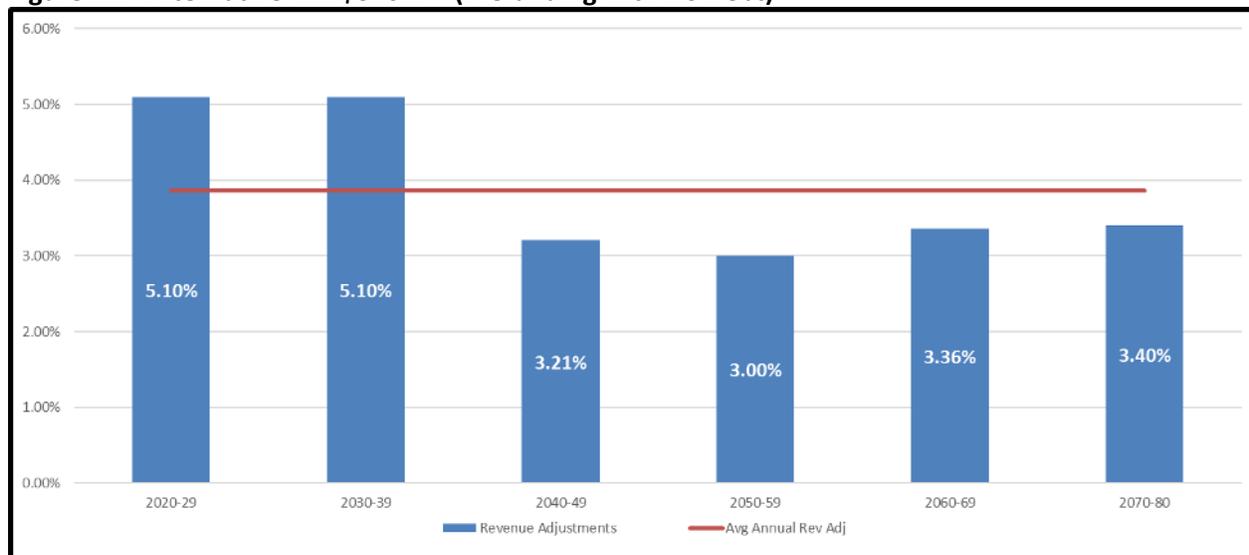


Alternative 4.2 is the same as Alternative 4.1, but with prefunding included. Prefunding primarily mitigates the increases during the first 10 years of the project shown in Alternative 4.1, while very modestly also reducing future revenue adjustments when compared to Alternative 4.1. Revenue adjustments increase up to 5.10% from FY 2020 through FY 20209 and reduces the 6.8% increases in Alternative 4.1 down to 5.1%. Table 9 provides a summary of Alternative 4.2 financial plan with key metrics in relation to the Study and Figure 12 identifies the expected revenue adjustments between 2020 through 2080.

**Table 9. Alternative 4.2: \$320M – (Prefunding with No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	3.86%	No	Yes

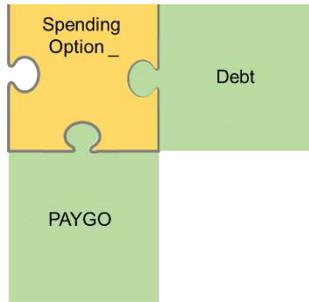
**Figure 12. Alternative 4.2: \$320M – (Prefunding with No Debt)**



#### Key Considerations:

- Prefunding smooths out revenue adjustments during first 10 years of project.
- Annual revenue adjustments equal 5.10% for next 20 years.
- Future increases from FY 2040 and beyond average 3.24% due to the ramp up in revenue during the first 20 years of planning period.
- Revenue needs generate inter-generational inequity
- More than 50% of water mains replaced.

**Alternative 4.3: \$320M – (No Prefunding with Debt)**

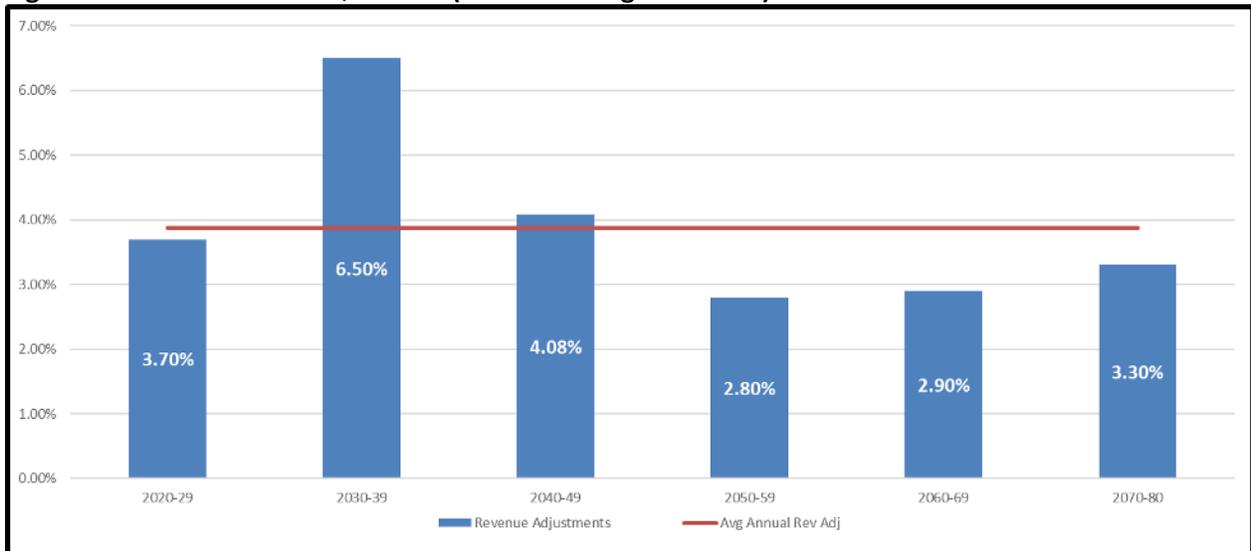


Alternative 4.3 is the first spending Alternative where debt is introduced to mitigate revenue increases by funding a portion of the Study cost with bond proceeds while incurring debt payments amortized over a 30-year amortization schedule. Within Alternative 4.3, 8% of the project is funded with debt with an initial bond issue in FY 2030 to reduce the revenue increase shown in Alternative 4.1. With the inclusion of debt, interest would add \$78M to the total project cost; however, there may be opportunities to pay off debt early and eliminate future interest payments. Table 10 provides a summary of Alternative 4.3 financial plan with key metrics in relation to the Study and Figure 13 identifies the expected revenue adjustments between 2020 through 2080.

**Table 10. Alternative 4.3: \$320M – (No Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	3.60%	8%	No

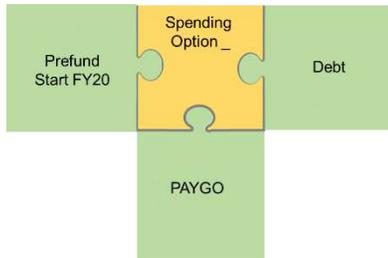
**Figure 13. Alternative 4.3: \$320M – (No Prefunding with Debt)**



**Key Considerations:**

- Debt represents 8% of funding
- Slight reduced revenue needs during first 10 years of project when compared to Alternative 4.1.
- Interest on bonds adds \$78M to project cost assuming no early redemption on bonds.
- More than 50% of water mains replaced.

**Alternative 4.4: \$320M – (Prefunding with Debt)**

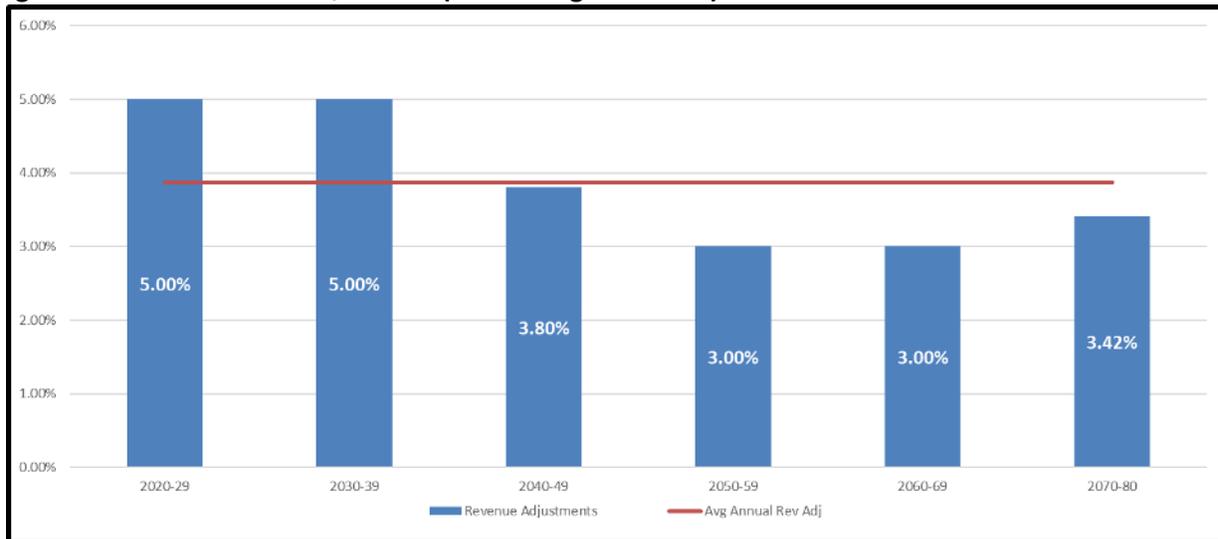


Alternative 4.4 includes both prefunding as well as debt. With the inclusion of prefunding, the amount of debt may be reduced and is primarily used to offset funding shortages and maintain reserves at adequate levels. Within Alternative 4.4, 5% of the project is funded with debt while funding is slowly increased commencing in FY 2020. With the inclusion of debt, interest would add \$48M to the total project cost; however, there may be opportunities to pay off debt early and eliminate future interest payments. Table 11 provides a summary of Alternative 4.4 financial plan with key metrics in relation to the Study and Figure 14 identifies the expected revenue adjustments between 2020 through 2080.

**Table 11. Alternative 4.4: \$320M – (Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	3.87%	5%	Yes

**Figure 14. Alternative 4.4: \$320M – (Prefunding with Debt)**



**Key Considerations:**

- Average annual rate increase is slightly higher than Alternative 4.3, but interest reduced by \$30M.
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant revenue spikes in a specific year.
- Interest on bonds adds \$48M to project cost assuming no early redemption on bonds.
- More than 50% of water mains replaced.

### **Alternative 5.1: \$390M – (No Prefunding and No Debt)**

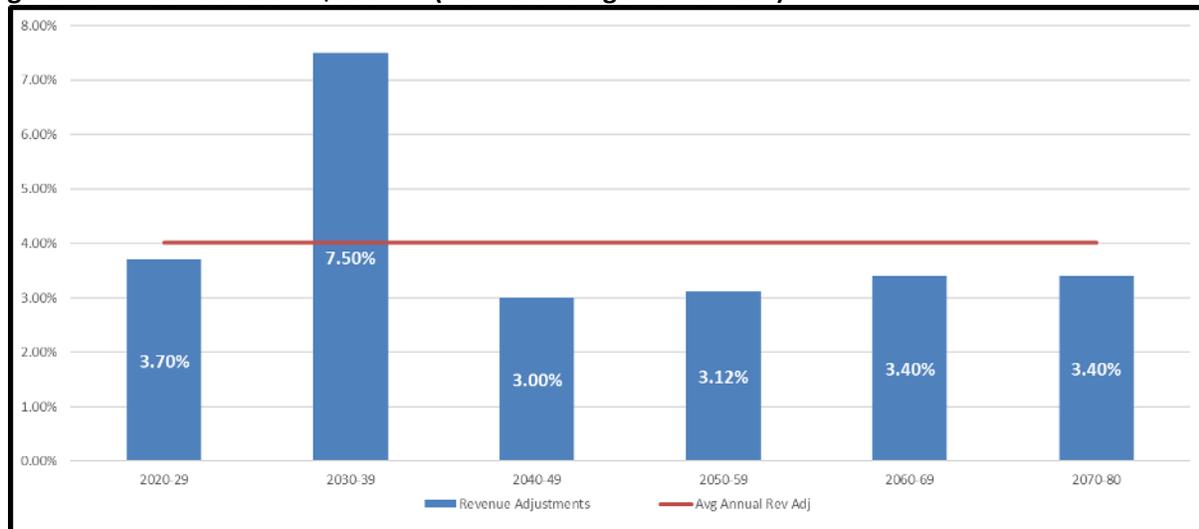


Alternative 5.1 reflects a significant increase in water main replacement for a total project cost of \$390M with annual spending of \$7.8M in 2018 dollars. At this level of spending, the exclusion of Prefunding and Debt requires significant spikes in funding. During the first two years of construction, revenue would need to increase by 30% and 20% in FY 2030 and FY 2031, respectively. With these substantial increases, this funding Alternative approach for this level of spending would not be viable. Table 12 provides a summary of Alternative 5.1 financial plan with key metrics in relation to the Study and Figure 15 identifies the expected revenue adjustments between 2020 through 2080.

**Table 12. Alternative 5.1: \$390M – (No Prefunding and No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
<b>Baseline</b>	\$390M	72%	3.10%	4.02%	No	No

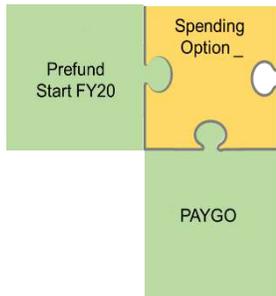
**Figure 15. Alternative 5.1: \$390M – (No Prefunding and No Debt)**



#### **Key Considerations:**

- No prefunding requires higher revenue adjustments between 2030-2039.
- 30% increase in revenue required in FY 2030 followed by 20% increase in FY 2031.
- Revenue needs generate inter-generational inequity with existing customers primarily impacted.
- Revenue adjustments significantly fluctuate due to need to ramp up in early years of project.
- More than 72% of water mains replaced.

**Alternative 5.2: \$390M – (Prefunding with No Debt)**

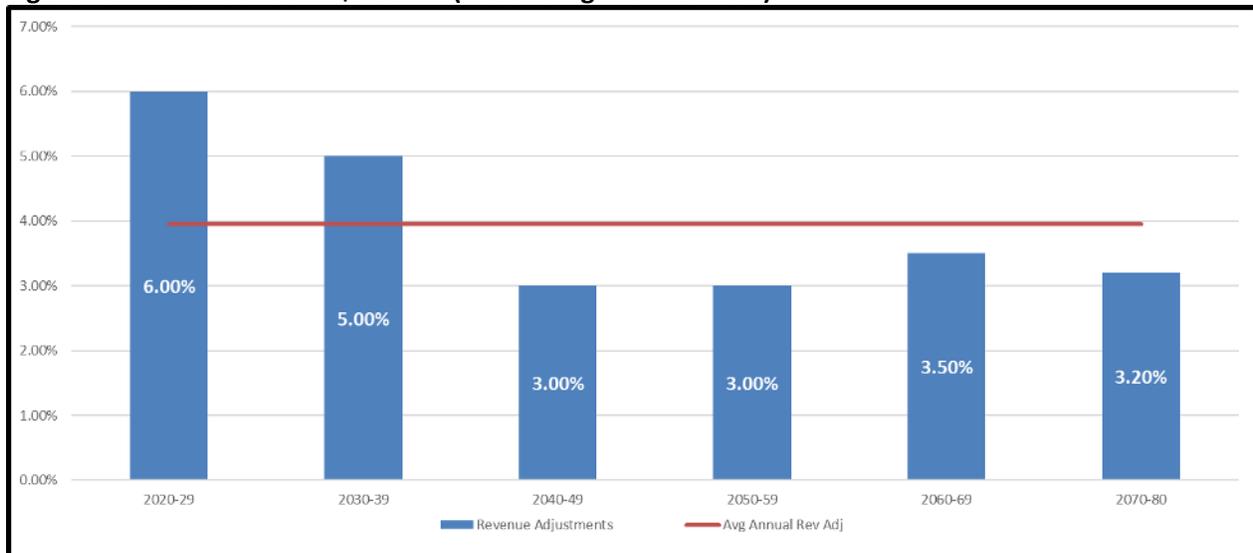


Alternative 5.2 incorporates prefunding with the primary goal to eliminate the significant revenue increases at the start of the project identified in Alternative 5.1. By adjusting revenue commencing in FY 2020, adjustments during the first 10 years of the project are reduced to 5% from 7.5% and eliminates the significant revenue spikes in FY 2030 and FY 2031. Table 13 provides a summary of Alternative 5.2 financial plan with key metrics in relation to the Study and Figure 16 identifies the expected revenue adjustments between 2020 through 2080.

**Table 13. Alternative 5.2: \$390M – (Prefunding with No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$390M	72%	3.10%	3.95%	No	Yes

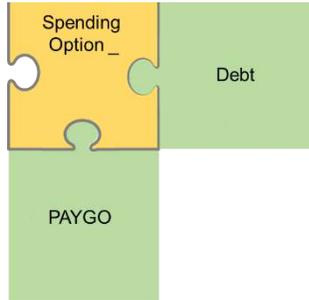
**Figure 16. Alternative 5.2: \$390M – (Prefunding with No Debt)**



**Key Considerations:**

- Prefunding smooths out revenue adjustments during first 10 years of project.
- Eliminates significant increases in revenue in FY 2030 and FY 2031 identified in Alternative 5.1.
- Annual average revenue adjustments equal 3.95% over project completion.
- Future revenue increases from FY 2040 and beyond average 3.18% due to the ramp up in revenue during the first 20 years of planning period.
- More than 72% of water mains replaced.

**Alternative 5.3: \$390M – (No Prefunding with Debt)**

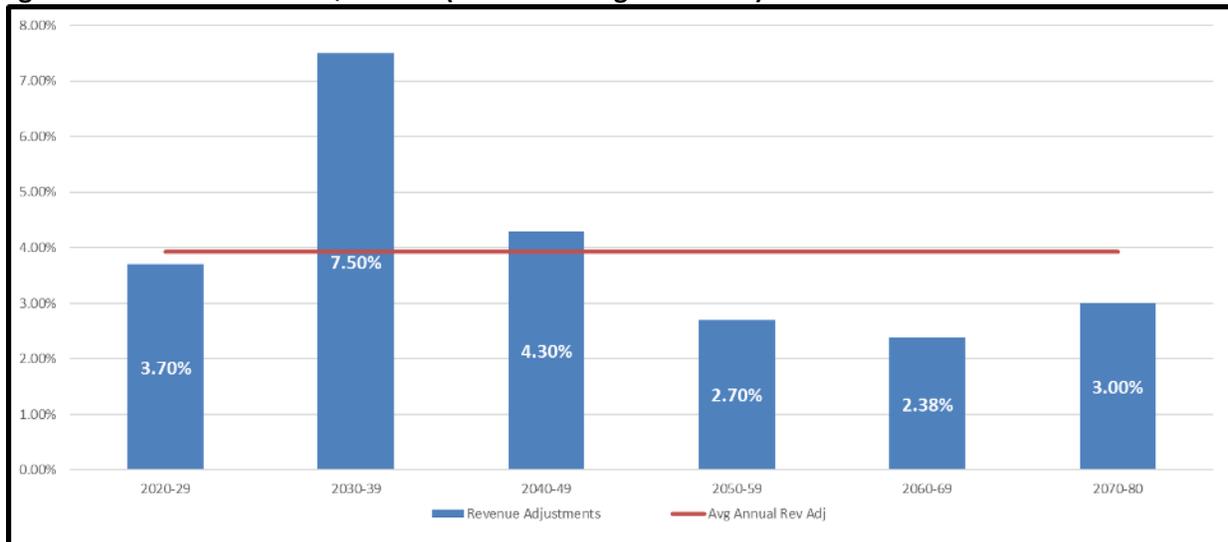


Alternative 5.3 removes prefunding but includes debt financing. Within Alternative 5.3, 10% of the project is funded with debt with an initial bond issue in FY 2030. This Alternative isn't much different from Alternative 5.1 when comparing average annual revenue adjustments of 4.02% in Alternative 5.1 to 3.93% in Alternative 5.3; however, the significant increases in FY 2030 and FY 2031 are eliminated with the introduction of debt financing. With the inclusion of debt, interest would add \$122M to the total project cost; however, there may be opportunities to pay off debt early and eliminate future interest payments. Table 14 provides a summary of Alternative 5.3 financial plan with key metrics in relation to the Study and Figure 17 identifies the expected revenue adjustments between 2020 through 2080.

**Table 14. Alternative 5.3: \$390M – (No Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$390M	72%	3.10%	3.93%	10%	No

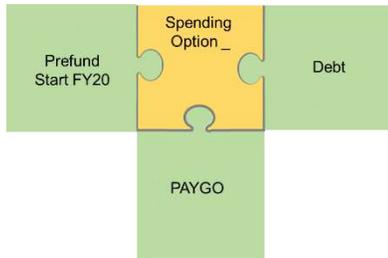
**Figure 17. Alternative 5.3: \$390M – (No Prefunding with Debt)**



**Key Considerations:**

- Inclusion of debt eliminates revenue spikes in FY 2030 and FY 2031 as shown in Alternative 5.1.
- Debt represents 10% of funding
- Interest on bonds adds \$122M to project cost assuming no early redemption on bonds.
- More than 72% of water mains – replaced.

**Alternative 5.4: \$390M – (Prefunding with Debt)**

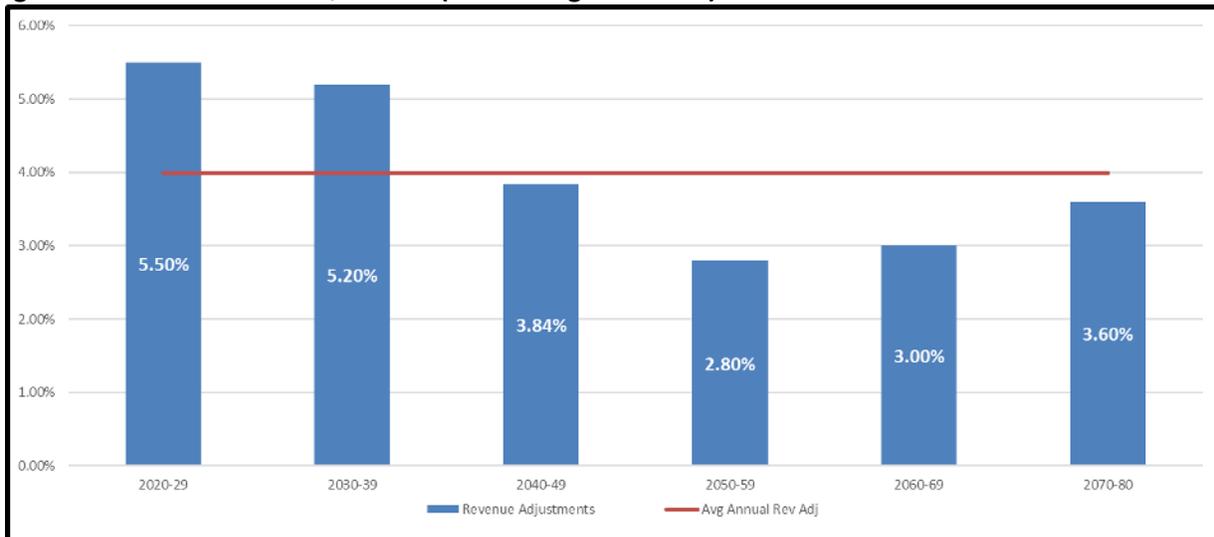


Alternative 5.4 includes both prefunding as well as debt. With the inclusion of prefunding, the amount of debt may be reduced and is primarily used to offset funding shortages for annual cashflow and maintain reserves at adequate levels. Within Alternative 5.4, 4% of the project is funded with debt as funding is slowly increased commencing in FY 2020. With the inclusion of debt, interest would add \$48M to the total project cost; however, there may be opportunities to pay off debt early and eliminate future interest payments. Table 15 provides a summary of Alternative 5.4 financial plan with key metrics in relation to the Study and Figure 18 identifies the expected revenue adjustments between 2020 through 2080.

**Table 15. Alternative 5.4: \$390M – (Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$390M	72%	3.10%	3.99%	4%	Yes

**Figure 18. Alternative 5.4: \$390M – (Prefunding with Debt)**



**Key Considerations:**

- Average annual rate increase is slightly higher than Alternative 5.3, but interest reduced by \$74M.
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant spikes in a specific year.
- Interest on bonds adds \$48M to project cost assuming no early redemption on bonds.
- More than 72% of water mains replaced.

**Alternative 6.1: \$480M – (No Prefunding and No Debt)**

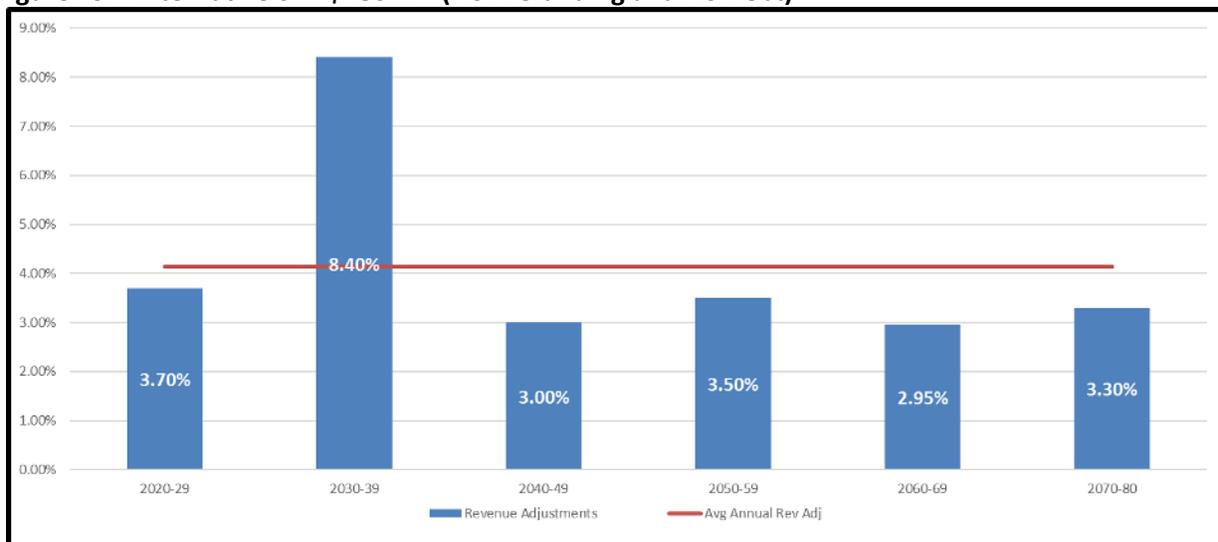


Alternative 6.1 reflects a significant increase in water main replacement for a total project cost of \$480M with annual spending of \$9.6M in 2018 dollars. At this level of spending, the exclusion of prefunding and debt requires significant spikes in funding. During the first two years of construction, revenue would need to increase by 30% and 30% in FY 2030 and FY 2031, respectively. With these substantial increases, this funding Alternative approach for this level of spending would not be viable. Table 16 provides a summary of Alternative 6.1 financial plan with key metrics in relation to the Study and Figure 19 identifies the expected revenue adjustments between 2020 through 2080.

**Table 16. Alternative 6.1: \$480M – (No Prefunding and No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$480M	89%	10%	3.60%	No	No

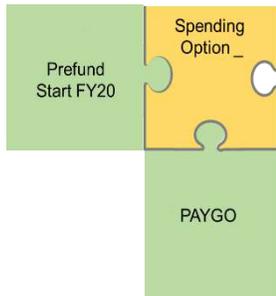
**Figure 19. Alternative 6.1: \$480M – (No Prefunding and No Debt)**



**Key Considerations:**

- No prefunding requires higher revenue adjustments between 2030-2039.
- 30% increase in revenue required in FY 2030 and FY 2031.
- Revenue adjustments significantly fluctuate due to need to ramp up in early years of project.
- Revenue needs generate inter-generational inequity with existing customers primarily impacted
- More than 89% of water mains replaced.

**Alternative 6.2: \$480M – (Prefunding with No Debt)**

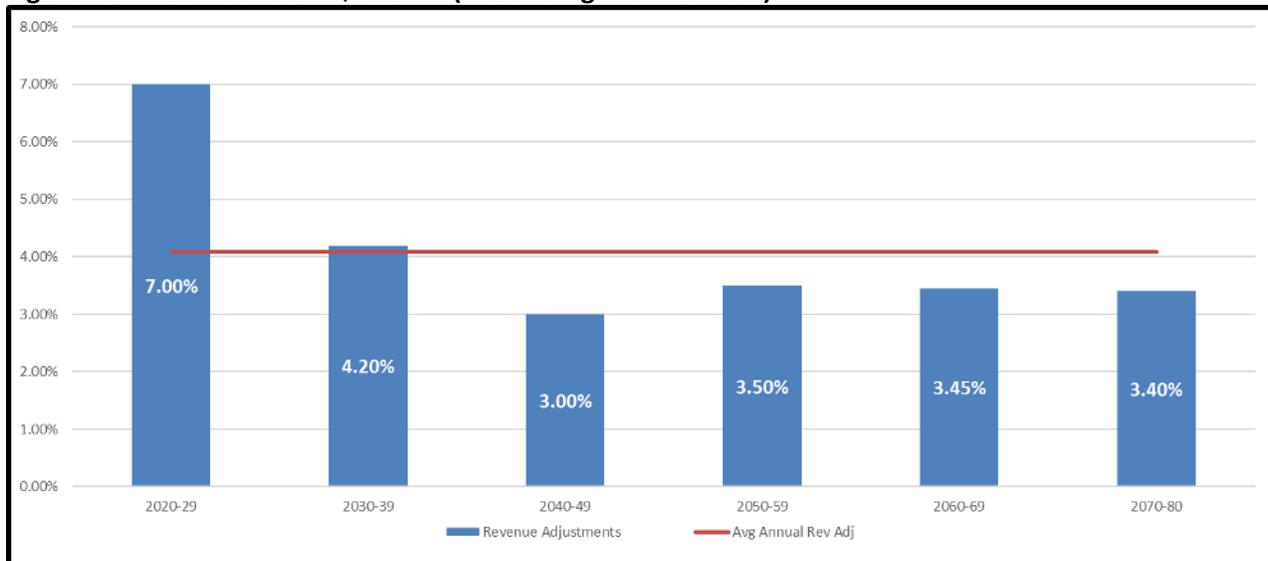


Alternative 6.2 incorporates prefunding with the primary goal to eliminate the significant revenue increases at the start of the project identified in Alternative 6.1. By adjusting revenue commencing in FY 2020, adjustments during the first 10 years of the project are reduced to 4.2% from 8.4% and eliminates the significant revenue spikes in FY 2030 and FY 2031. Table 17 provides a summary of Alternative 6.2 financial plan with key metrics in relation to the Study and Figure 20 identifies the expected revenue adjustments between 2020 through 2080.

**Table 17. Alternative 6.2: \$480M – (Prefunding with No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
<b>Baseline</b>	\$480M	89%	10%	4.09%	No	<b>Yes</b>

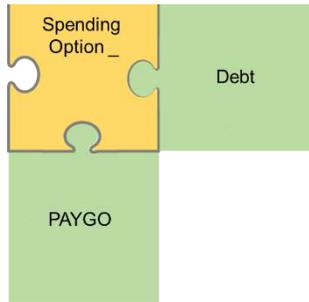
**Figure 20. Alternative 6.2: \$480M – (Prefunding with No Debt)**



**Key Considerations:**

- Prefunding smooths out revenue adjustments during first 10 years of project.
- Eliminates significant revenue increases in FY 2030 and FY 2031 identified in Alternative 6.1.
- Annual average revenue adjustments equal 4.09% over project completion.
- Future revenue increases from FY 2040 and beyond average 3.34% due to the ramp up in revenue during the first 20 years of planning period.
- More than 89% of water mains replaced.

**Alternative 6.3: \$480M – (No Prefunding with Debt)**

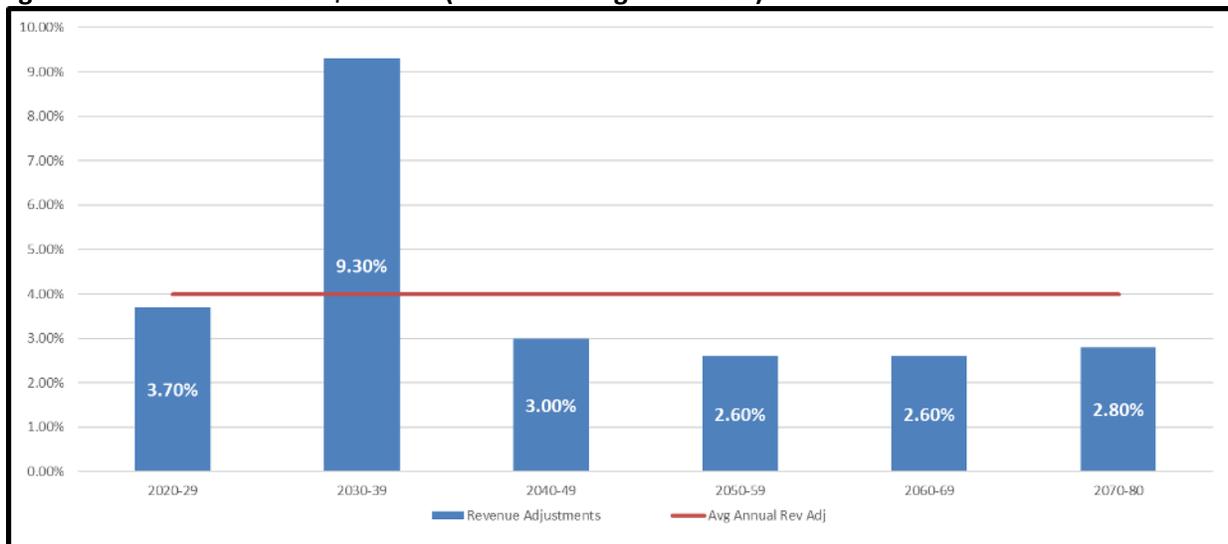


Alternative 6.3 removes prefunding but includes debt financing. Within Alternative 5.3, 6% of the project is funded with debt with an initial bond issue in FY 2030. This Alternative eliminates the significant increases in FY 2030 and FY 2031. However, without prefunding, revenue increases are still relatively high during the first ten years of the project to cover increased spending and additional debt service payments. With the inclusion of debt, interest would add \$96M to the total project cost; however, the debt service payments extend over 34 years and there may be opportunities to pay off debt early and eliminate future interest payments. Table 18 provides a summary of Alternative 6.3 financial plan with key metrics in relation to the Study and Figure 21 identifies the expected revenue adjustments between 2020 through 2080.

**Table 18. Alternative 6.3: \$480M – (No Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$480M	89%	10%	4.00%	6%	No

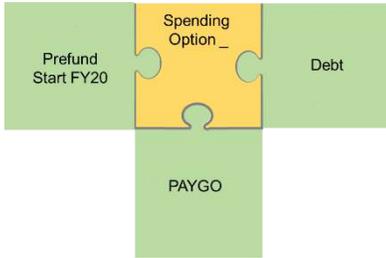
**Figure 21. Alternative 6.3: \$480M – (No Prefunding with Debt)**



**Key Considerations:**

- Inclusion of debt eliminates revenue spikes in FY 2030 and FY 2031 as shown in Alternative 6.1.
- Revenue adjustments are still high for first 10 years due to no Prefunding
- Debt represents 6% of funding
- Interest on bonds adds \$96M to project cost but extends over 34 years.
- More than 89% of water mains replaced.

**Alternative 6.4: \$480M – (Prefunding with Debt)**

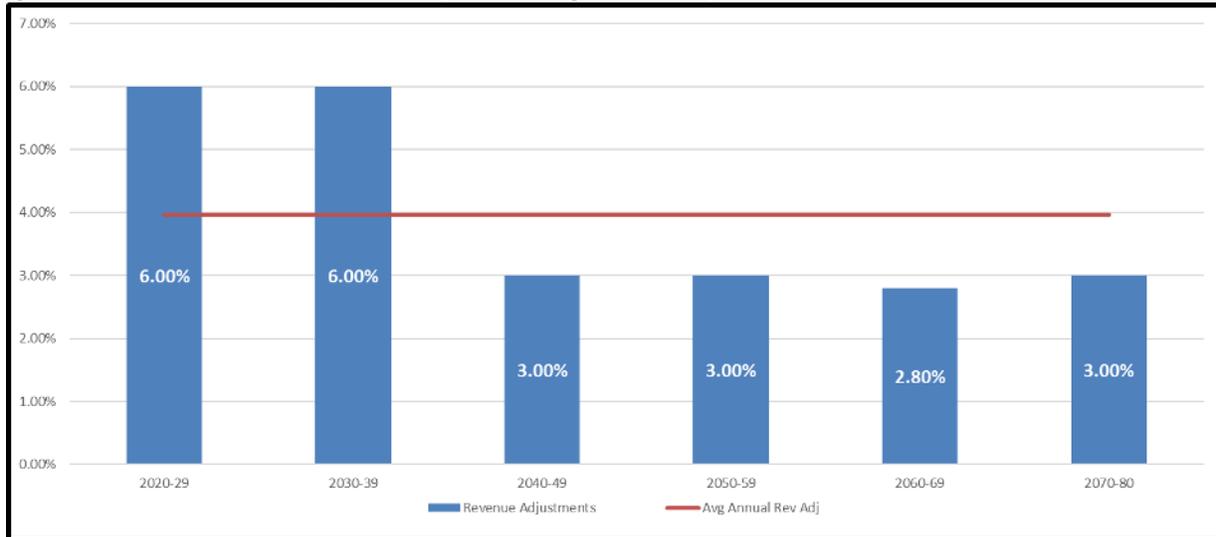


Alternative 6.4 includes both prefunding as well as debt. With the inclusion of prefunding, debt is slightly increased within this Alternative whereas in previous similar Alternatives, debt was reduced. With prefunding and 9% of the project funded through debt financing, the average annual revenue increase through project completion is 3.97%. Interest would add \$132M to the total project cost; however, the debt service payments extend over 72 years and there may be opportunities to pay off debt early and eliminate future interest payments. Table 19 provides a summary of Alternative 6.4 financial plan with key metrics in relation to the Study and Figure 22 identifies the expected revenue adjustments between 2020 through 2080.

**Table 19. Alternative 6.4: \$480M – (Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$480M	89%	10%	3.97%	9%	Yes

**Figure 22. Alternative 6.4: \$480M – (Prefunding with Debt)**



**Key Considerations:**

- First 20 years, average annual revenue increase limited to 6%
- Future years, average annual revenue increase limited to 3%
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant revenue spikes in a specific year.
- Interest on bonds adds \$132M to project cost but extends over 72 years.
- More than 89% of water mains replaced.

**Alternative 7.1: \$510M – (No Prefunding and No Debt)**

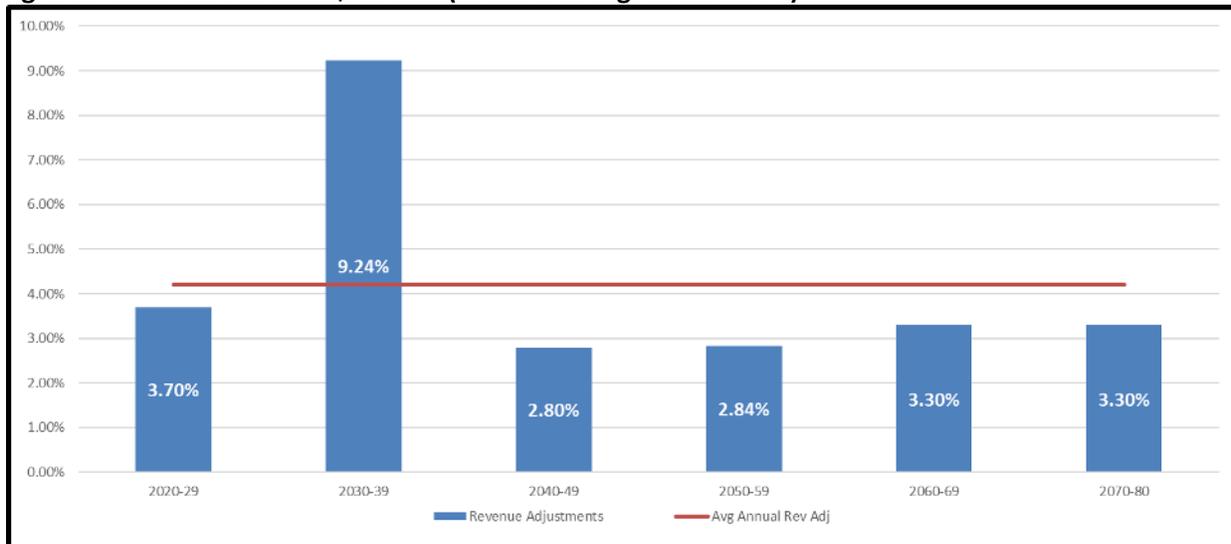


Alternative 7.1 reflects a greatest reinvestment in water main replacement for a total project cost of \$510M with annual spending of \$10.2M in 2018 dollars. At this level of spending, the exclusion of prefunding and debt requires significant spikes in funding. During the first two years of construction, revenue would need to increase by 35% for FY 2030 and FY 2031. With these substantial increases, this funding Alternative approach for this level of spending would not be a viable Alternative but is included for comparison purposes. Table 20 provides a summary of Alternative 7.1 financial plan with key metrics in relation to the Study and Figure 23 identifies the expected revenue adjustments between 2020 through 2080.

**Table 20. Alternative 7.1: \$510M – (No Prefunding and No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$510M	94%	16.50%	4.20%	No	Yes

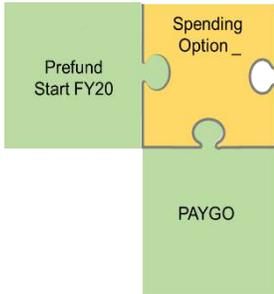
**Figure 23. Alternative 7.1: \$510M – (No Prefunding and No Debt)**



**Key Considerations:**

- No prefunding requires significant revenue adjustments between 2030-2039.
- 35% increase in revenue required in FY 2030 followed by 20% increase in FY 2031.
- Revenue needs generate inter-generational inequity with existing customers primarily impacted
- Revenue adjustments significantly fluctuate due to need to ramp up in early years of project.
- Approximately 94% of water mains replaced.

**Alternative 7.2: \$510M – (Prefunding with No Debt)**

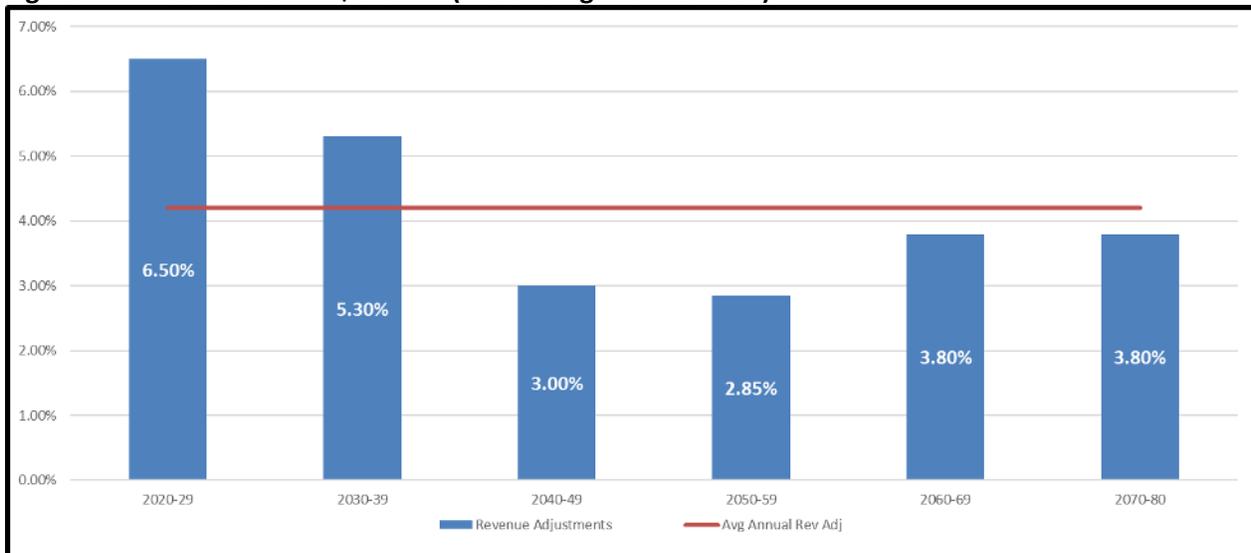


Alternative 7.2 incorporates prefunding with the primary goal to eliminate the significant revenue increases at the start of the project identified in Alternative 7.1. By adjusting revenue commencing in FY 2020, adjustments during the first 10 years of the project are reduced to 5.3% from 9.24% and eliminates the significant revenue spikes in FY 2030 and FY 2031. Table 21 provides a summary of Alternative 7.2 financial plan with key metrics in relation to the Study and Figure 24 identifies the expected revenue adjustments between 2020 through 2080.

**Table 21. Alternative 7.2: \$510M – (Prefunding with No Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
<b>Baseline</b>	\$510M	94%	16.50%	4.21%	No	<b>Yes</b>

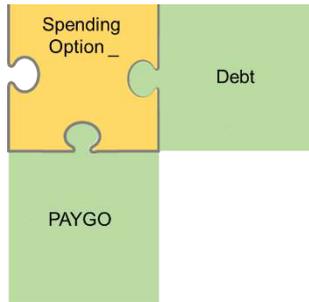
**Figure 24. Alternative 7.2: \$510M – (Prefunding with No Debt)**



**Key Considerations:**

- Prefunding smooths out revenue adjustments during first 10 years of project.
- Eliminates significant revenue increases in FY 2030 and FY 2031 identified in Alternative 7.1.
- Revenue needs front loaded during first 20 years.
- Future revenue increases from FY 2040 and beyond average 3.36% due to the ramp up in revenue during the first 20 years of planning period.
- Approximately 94% of water mains replaced.

**Alternative 7.3: \$510M – (No Prefunding with Debt)**

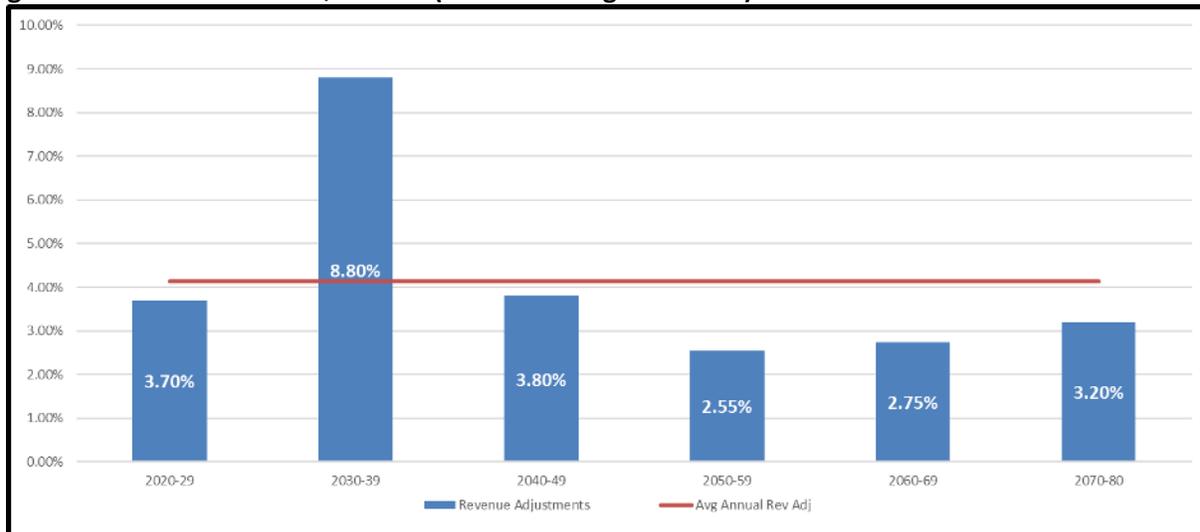


Alternative 7.3 removes prefunding but includes debt financing. Within Alternative 7.3, 6% of the project is funded with debt with an initial bond issue in FY 2030. This Alternative isn't much different from Alternative 7.1 when comparing average annual revenue adjustments of 4.20% in Alternative 7.1 to 4.13% in Alternative 7.3; however, the significant revenue increases in FY 2030 and FY 2031 are eliminated with the introduction of debt financing. With the inclusion of debt, interest would add \$96M to the total project cost; however, there may be opportunities to pay off debt early and eliminate future interest payments. Table 22 provides a summary of Alternative 7.3 financial plan with key metrics in relation to the Study and Figure 24 identifies the expected revenue adjustments between 2020 through 2080.

**Table 22. Alternative 7.3: \$510M – (No Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$510M	94%	16.50%	4.13%	6%	No

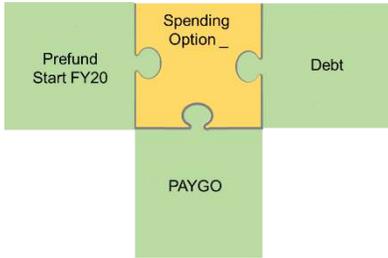
**Figure 25. Alternative 7.3: \$510M – (No Prefunding with Debt)**



**Key Considerations:**

- Inclusion of debt eliminates revenue spikes in FY 2030 and FY 2031 as shown in Alternative 7.1.
- Debt represents 6% of funding.
- Interest on bonds adds \$96M to project cost but extends over 34 years.
- Approximately 94% of water mains replaced.

**Alternative 7.4: \$510M – (Prefunding with Debt)**

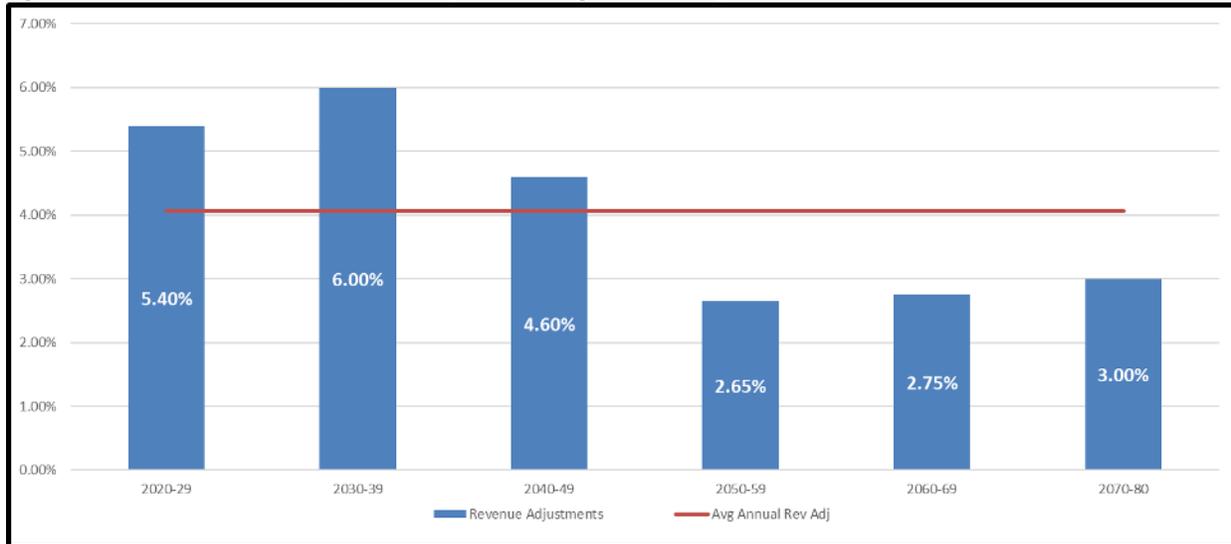


Alternative 7.4 includes both prefunding as well as debt. With the inclusion of prefunding, debt is slightly increased within this Alternative whereas in certain previous similar Alternatives, debt was reduced. With prefunding and 15% of the project funded through debt financing, the average annual revenue increase through project completion is 4.07%. Interest would add \$249M to the total project cost over 74 years; however, there may be opportunities to pay off debt early and eliminate future interest payments. Table 23 provides a summary of Alternative 7.4 financial plan with key metrics in relation to the Study and Figure 26 identifies the expected revenue adjustments between 2020 through 2080.

**Table 23. Alternative 7.4: \$510M – (Prefunding with Debt)**

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$510M	94%	16.50%	4.07%	15%	Yes

**Figure 26. Alternative 7.4: \$510M – (Prefunding with Debt)**



**Key Considerations:**

- First 20 years, average annual revenue increase limited to 5.7%
- Future years, average annual revenue increase limited to 3.25%
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant revenue spikes in a specific year.
- Interest on bonds adds \$249M to project cost but extends over 74 years.
- More than 89% of water mains replaced.

## NEXT STEPS

Through upcoming workshops, the District will evaluate these 21 different spending and funding alternatives and compare the key considerations of each. Through a series of CAC meetings, these 21 alternatives will be winnowed down to the top two (2) or three (3) alternatives. A market research firm will then conduct a hybrid internet and telephone survey of 500 District customers and property owners of the top 2 or 3 alternatives to provide additional input to the District and CAC members. With this information and through workshops, the District will develop an implementation plan to recommend to the District's Board of Directors for discussion and possible action.

EXHIBIT A

Alternative	Funding Description	Spending			Funding									
		Project Cost 2018	Years to Complete	Annual Spending	Total Cost (Inflated)	Percent Debt	Interest	Avg Annual Rate Increase (2020-2029)	Avg Annual Rate Increase (2030-2039)	Avg Annual Rate Increase (2040-2049)	Avg Annual Rate Increase (2050-2059)	Avg Annual Rate Increase (2060-2069)	Avg Annual Rate Increase (2070-2080)	Avg Annual Rate Increase (Through 2079)
1	Baseline	\$100	50	\$2.0	\$759	0%	\$0	3.70%	4.20%	3.70%	3.28%	3.10%	3.50%	3.58%
2.1	No-Prefunding; No Debt	"	"	"	"	0%	\$0	3.70%	5.50%	2.52%	2.70%	3.93%	3.90%	3.71%
2.2	Prefunding; No Debt	\$150	50	\$3.0	\$507	0%	\$0	4.01%	4.20%	3.50%	3.30%	3.30%	3.30%	3.60%
3.1	No-Prefunding; No Debt	"	"	"	"	0%	\$0	3.70%	5.32%	2.77%	3.50%	3.70%	2.96%	3.66%
3.2	Prefunding; No Debt	\$200	50	\$4.0	\$677	0%	\$0	4.41%	4.20%	3.70%	3.28%	3.10%	3.15%	3.64%
4.1	No-Prefunding; No Debt	"	"	"	"	0%	\$0	3.70%	6.80%	3.25%	3.60%	3.20%	3.65%	4.03%
4.2	Prefunding; No Debt	"	"	"	"	0%	\$0	5.10%	5.10%	3.21%	3.00%	3.36%	3.40%	3.86%
4.3	No-Prefunding w/ Debt	"	"	"	\$1,080	8%	\$78	3.70%	6.50%	4.08%	2.80%	2.90%	3.30%	3.88%
4.4	Prefunding w/ Debt	\$320	50	\$6.4	\$1,080	5%	\$48	5.00%	5.00%	3.80%	3.00%	3.00%	3.42%	3.87%
5.1	No-Prefunding; No Debt	"	"	"	"	0%	\$0	3.70%	7.50%	3.00%	3.12%	3.40%	3.40%	4.02%
5.2	Prefunding; No Debt	"	"	"	"	0%	\$0	6.00%	5.00%	3.00%	3.00%	3.50%	3.20%	3.95%
5.3	No-Prefunding w/ Debt	"	"	"	\$1,300	10%	\$122	3.70%	7.50%	4.30%	2.70%	2.38%	3.00%	3.93%
5.4	Prefunding w/ Debt	\$390	50	\$7.8	\$1,300	4%	\$48	5.50%	5.20%	3.84%	2.80%	3.00%	3.60%	3.99%
6.1	No-Prefunding; No Debt	"	"	"	"	0%	\$0	3.70%	8.40%	3.00%	3.50%	2.95%	3.30%	4.14%
6.2	Prefunding; No Debt	"	"	"	"	0%	\$0	7.00%	4.20%	3.00%	3.50%	3.45%	3.40%	4.09%
6.3	No-Prefunding w/ Debt	"	"	"	\$1,600	6%	\$96	3.70%	9.30%	3.00%	2.60%	2.80%	2.80%	4.00%
6.4	Prefunding w/ Debt	\$480	50	\$9.6	\$1,600	9%	\$132	6.00%	6.00%	3.00%	3.00%	2.80%	3.00%	3.97%
7.1	No-Prefunding; No Debt	"	"	"	"	0%	\$0	3.70%	9.24%	2.80%	2.84%	3.30%	3.30%	4.20%
7.2	Prefunding; No Debt	"	"	"	"	0%	\$0	6.50%	5.30%	3.00%	2.85%	3.80%	3.80%	4.21%
7.3	No-Prefunding w/ Debt	"	"	"	\$1,700	6%	\$96	3.70%	8.80%	3.80%	2.55%	2.75%	3.20%	4.13%
7.4	Prefunding w/ Debt	\$510	50	\$10.2	\$1,700	15%	\$249	5.40%	6.00%	4.60%	2.65%	2.75%	3.00%	4.07%