MINUTES OF THE SPECIAL MEETING OF THE
BOARD OF DIRECTORS OF
VISTA IRRIGATION DISTRICT

March 11, 2020

A Special Meeting of the Board of Directors of Vista Irrigation District was held on Wednesday, March 11, 2020 at the offices of the District, 1391 Engineer Street, Vista, California.

1. CALL TO ORDER

President Vásquez called the meeting to order at 9:00 a.m.

2. ROLL CALL

Directors present: Miller, Vásquez, Dorey, Sanchez, and MacKenzie.

Directors absent: None.

Staff present: Brett Hodgkiss, General Manager; Lisa Soto, Secretary of the Board; Don Smith, Director of Water Resources; Randy Whitmann, Director of Engineering; Frank Wolinski, Director of Operations and Field Services; Greg Keppler, Engineering Project Manager; Mark Saltz, Water Resources Specialist; Marlene Kelleher, Director of Administration; and Ramae Ogilvie, Administrative Assistant. General Counsel David Cosgrove was also present.

Other attendees: Doug Gillingham, Gillingham Water; Don MacFarlane, DLM Engineering; Ken Weinberg, Weinberg Water Resources; J.P. Semper and Paige Russell, Brown and Caldwell; Angela Morrow and Chris McKinney, City of Escondido.

3. PLEDGE OF ALLEGIANCE

President Vásquez led the pledge of allegiance.

4. APPROVAL OF AGENDA

20-03-24	***Upon motion by Director MacKenzie, seconded by Director Miller and unanimously carried (5 ayes: Miller, Dorey, Sanchez, MacKenzie, and Vásquez), the Board of Directors approved the agenda as presented.***

5. ORAL COMMUNICATIONS

No public comments were presented on items not appearing on the agenda.

6. WATER SUPPLY PLANNING STUDY

See staff report attached hereto.

Director of Engineering Randy Whitmann welcomed everyone to the third and final Water Supply Planning Study (Study) Workshop. He introduced Mr. Doug Gillingham of Gillingham Water Planning and Engineering, Inc. Using a PowerPoint presentation (attached hereto as Exhibit A), Mr. Gillingham provided a brief review of the previous two workshops, recalling that the first workshop was conducted in April

2019. This workshop focused on a long list of alternatives of whether "to Flume or not to Flume" (i.e. to rehabilitate or replace the Flume versus to retire the Flume altogether), project goals and objectives, and evaluation criteria to be used going forward. At the second workshop in August 2019, the project team (Team) presented its evaluation of the alternatives at the "course screening" level. Mr. Gillingham stated that the purpose of this workshop is for the Board to receive the Team's findings from the "fine screening" analysis, provide input and select a preferred alternative going forward.

Mr. Gillingham stated that the fine screening analysis revealed that the balance scale favors the "To Flume" option. He introduced Mr. Don MacFarlane of DLM Engineering to present the fine screening findings for investigation Box 3, "Local Water System and Treatment". Mr. MacFarlane stated that the analysis performed for the Box 3 portion of the Study concerns itself with the long-term costs to operate, maintain, repair and replace the District's local water system. He stated that the Team consulted with a national expert in asset management to refine and confirm the budgeting approach and with a national expert in dams to refine the long-term costs of maintaining the Henshaw Dam. The Team also consulted with City of Escondido (Escondido) staff regarding the Escondido Canal and confirmed that continuous repair of the Escondido Canal is the intended and preferred course of action for the canal over replacement.

Mr. MacFarlane said that the Team developed an asset management approach for budgeting for the future, and for each facility or group of facilities, developed replacement costs and/or ongoing maintenance costs. The Team assumed a range of useful lives from 50-70 years for each facility and developed low, middle, and high range costs. It was noted that Warner Ranch license/lease revenues were not included in these calculations. Mr. MacFarlane stated that based on the middle range costs an increased investment will be needed for the long-term sustainability of the District's local water system.

Mr. Ken Weinberg of Weinberg Water Resources reviewed the findings for investigation Box 4, "Local Water Transfer Options" which he characterized as part of the "Not to Flume" equation. He stated that the goal of this portion of the analysis was to determine the feasibility of a local water transfer arrangement between the District and a partner agency, and the level of revenue such a deal could generate for the District. After identifying all of the potential transfer partners geographically, the field was narrowed to the most realistic opportunities. Mr. Weinberg stated that a significant constraint on the District's selection of an exchange partner was the San Luis Rey Indian Water Rights Settlement Agreement (Settlement Agreement) which limits the use of local water solely to the Settlement Agreement parties, leaving Escondido as the only viable option. Mr. Weinberg noted that Escondido would be limited on how much local water it could take due to its need to blend local water with imported water to meet water quality standards as well as its overall long-term reduction in treated water demand.

Mr. Weinberg stated that the financial benefits of an exchange agreement with Escondido would be determined by how much local water Escondido would be able to take and at what price. The amount of water Escondido would be able to receive year to year would vary. Based on an estimated mid-range, long-term average transfer of 2,000-acre feet per year, combined with an assumed purchase price at mid-point between local water system costs and the Water Authority rate, the Team's analysis shows that the net exchange benefit to the District would not be large.

Mr. J.P. Semper of Brown and Caldwell presented Box 2, "System Improvements (without the Flume)", stating that this portion of the Study is primarily focused on water supply reliability during a planned 10-day aqueduct shut-down by the San Diego County Water Authority (Water Authority). He stated that as discussed in the last workshop, the best alternative would be the installation of isolation valves on the Water Authority's aqueduct system. The Team met with Water Authority staff and confirmed that the Aqueduct Isolation Valve Project (AIV Project) is scheduled for Fiscal Year 2022-23. The AIV Project would allow treated water shutdowns to be limited to just one of the two treated water pipelines at a time

(Pipeline 3 and Pipeline 4). Mr. Semper said that once these valves are in place, scheduled aqueduct shutdowns would no longer cut off treated water deliveries to the District.

In addition to the AIV Project, Mr. Semper reviewed two additional elements recommended for supply reliability in the "Not to Flume" option. The existing interconnects with the City of Oceanside and Vallecitos Water District (Vallecitos) would still be required, and the District would need to evaluate if modifications are necessary to existing agreements. Additionally, the future Pechstein II Reservoir would need to be enlarged from what is already planned. Both of these elements would make the District's system more robust; however, the most substantial reliability measure that would need to be undertaken is the Water Authority's AIV Project.

Mr. Semper briefly discussed the remaining Box 2 components. A range of costs to transfer the Boot and Bennett areas has been developed and remains unchanged from the previous workshop. A new component to the "Not to Flume" option is the cost savings associated with not needing to pump to the highest pressure zone when water is delivered from the Water Authority.

Ms. Paige Russell of Brown and Caldwell presented investigation Box 1, "Flume Rehabilitation / Replacement". She reviewed all of the existing bench, siphon, and tunnel sections of the Flume, noting the age and condition of each. She stated that, overall, the system is old, and none of the bench sections would be suitable for reuse. She said the easements might be able to be reused; however, many have limited access and difficult construction conditions. She said that many of the siphons would likely require full structural rehabilitation or replacement, but an internal condition assessment would be needed to determine their actual condition.

Ms. Russell stated that the Team has studied two alignments for replacing the Flume; one is referred to as the "Hybrid" alignment, which would make use of the existing sections of the Flume. She noted that only a few reaches would be usable in the Hybrid alignment, and the finished alignment would only allow for minimal pressurization. The Team also evaluated a conceptual "All-New" alignment which would be a buried pipeline, using a more direct route (approximately two miles shorter), that would cost less than the Hybrid alignment. The All-New alignment would consist of a completely new, fully pressurized pipeline located mostly in the public right-of-way. She emphasized that the All-New alignment is conceptual, and the actual alignment would need to be determined by an Alignment Study. Ms. Russell reviewed the preliminary cost estimates for the two alignments, stating that the estimated cost of the Hybrid alignment would be $130 million, and the estimated cost for the All-New alignment would be $120 million.

Mr. Gillingham clarified that, at this point in the Study, no particular alignment is being recommended; two conceptual alignments have been identified and it appears that the All-New alignment would be cost-preferred and have pressurization advantages. If the Board decides to move forward with the "To Flume" option, the next step would include preparation of a detailed preliminary design for all of the alignments alternatives, including environmental issues, and would ultimately identify a preferred route.

Ms. Russell reviewed the phasing opportunities that may be possible with the Hybrid alignment versus the All-New alignment. The Hybrid alignment may be able to be broken into six phases with the possibility of being split further into additional phases; this would allow the District to prioritize the most critical sections to replace, spread out capital costs of a number of years, explore funding opportunities, and potentially fund the project on a "pay as you go" basis. Because the All-New alignment lies mostly in the public right-of-way and crosses the existing Flume alignment less, it only has the potential to be split into two phases, which would not allow for as much attenuation of the District's capital costs.

Director MacKenzie asked about the status and condition of the Escondido Canal (Canal) which is vital for transporting water to the Escondido-Vista Treatment Plant. Mr. Gillingham stated that based on

conversations with Escondido staff about the Canal, Escondido's constant service and repair will continue to sustain the Canal indefinitely. He noted that historically there have been periods in which the canal was out of service for an entire year for various reasons, and this assumption was built into the Team's analysis. Escondido staff member Angela Morrow stated that the longevity of the Canal is good, and Escondido has no plans to eliminate or replace it. She added that Escondido has a full time crew that does nothing but repair and maintain the Canal. Escondido staff member Chris McKinney further assured the Board that Escondido will cooperate with the District concerning any Flume replacement right-of-way issues and any other issues that may come up associated with the Project.

Mr. Gillingham continued with the conclusions of the Study first highlighting some of the key assumptions. He stated that after a detailed analysis of the local water deliveries to the District during the period between 1960 and 2018, the mid-range average was 5,000-acre feet per year, which was used as the assumed long-term yield of the local water supply. Mr. Gillingham stated that another assumption used was that the Water Authority rates will likely increase at a rate faster than inflation. The mid-range projection is that Water Authority rates will increase each year at a rate that is about 1.5 percent greater than inflation for the next ten years, and at a rate equal to inflation for years 11 through 30.

Mr. Gillingham stated that the Team has met with a financial consultant, who is an expert in grant and loan funding opportunities for public agencies, and confirmed that there are favorable prospects for obtaining low-interest loans from the State Revolving Fund as well as from the America's Water Infrastructure Act. The assumption used in the analysis is that approximately 50 percent of the Project's capital cost would be funded by a State Revolving Fund loan, and the remaining 50 percent would be financed by the District at a higher interest rate. The melded mid-range cost of capital using these assumptions is 2.5 percent per year. Mr. Gillingham stated that the Team worked with District staff to determine a reasonable inflation rate for water system costs and arrived at a rate of three percent per year with the assumed internal discount rate for the District also being three percent per year. Mr. Gillingham stated that this is the financial basis for the calculations in the cost comparisons that were done comparing the "Not to Flume" versus "To Flume" options. The results show that the "To Flume" option is the least costly water supply alternative, having an estimated first-year unit cost of $2,000 per acre-foot and total 30-year present-worth cost of $240 million. In comparison, the "Not to Flume" option has an estimated first-year unit cost of $2,200 per acre-foot and total 30-year present-worth cost of $350 million.

Mr. Gillingham reviewed the comparison of major non-cost components of the two alternatives. Maximizing service reliability and operational effectiveness, implementing other opportunities and regional cooperation were all preferable in the "To Flume" option while capital outlay expenditures was preferable in the "Not to Flume" option. The category of minimizing environmental impacts and concerns was neutral for both options. Mr. Gillingham stated that all of these categories and values are subjective; however, in the Team's opinion, the "To Flume" option looks at least as good, if not better, than the "Not to Flume" option.

Mr. Gillingham reviewed a series of sensitivity analyses that were performed on the mid-range assumptions used in the Study and the impacts to the estimated 30-year costs. In this analysis, the variables of interest rates, Water Authority rate escalation, local water exchange revenue, Boot and Bennett exchange costs, Flume replacement costs, and average local water supply yield were all individually adjusted to be less favorable for the "To Flume" option; none of these adjustments tipped the cost balance scale to favor the "Not to Flume" option. Mr. Gillingham then showed another analysis in which all variables except average local water supply yield were adjusted to favor the "Not to Flume" option, and the scale became more balanced, but still slightly favored the "To Flume" option by $10 million. The only way for the scale to tip in favor of "Not to Flume" was to adjust all six variables, which would be a very unlikely scenario.

Mr. Gillingham reviewed the next steps for project implementation now that the final fine screening phase of the Study is complete. If the Board wishes to pursue the "Not to Flume" alternative, planning efforts would be required to retire the Flume, transition the Boot and Bennett areas to Vallecitos, build Pechstein II, coordinate timing of the AIV project with the Water Authority, and formalize terms for a water purchase agreement with Escondido. The estimated schedule for these tasks is between 12 and 24 months. For the "To Flume" option, the next steps in planning would include completing an alignment study, processing all necessary environmental documentation, financial planning, and other miscellaneous tasks that are all estimated to take between 18 and 36 months to complete. Following all of this preliminary work in the "To Flume" alternative, Mr. Gillingham estimated it could take an additional three years to complete the construction of the new pipeline. Mr. Gillingham stated that the decision to be made at this point in time is which path to pursue, "To Flume" or "Not to Flume". Mr. Gillingham concluded that the Team recommends the "To Flume" option.

The Board agreed that the time has come to make a decision regarding the future of the Flume and to move forward to the next step. The Board thanked M. Gillingham and his Team for the clear, concise, and thorough Study. Mr. Whitmann echoed the comments made regarding the Team. Mr. Hodgkiss joined in complimenting the Team, as well as District staff who spent a tremendous amount of time working with the Team on the Study. Mr. Hodgkiss also acknowledged Escondido staff and their cooperation and efforts in providing data needed to complete the Study. Mr. Hodgkiss thanked the Board as well, acknowledging that it is a big decision it has been tasked with, and the Board has demonstrated great leadership and courage in the process.

Mr. Whitmann reviewed next steps, stating that staff will add a line item to the Budget to proceed with Flume investigations and will begin developing a Scope of Work for an alignment study. He estimated that the alignment study could kick off around the beginning of the next fiscal year.

7. COMMENTS BY DIRECTORS

Director MacKenzie suggested that the Water Supply Planning Study be placed on an upcoming Board meeting agenda for further discussion and decision (by the Board) on whether to retire or rehabilitate/replace the Flume; President Vásquez and the Board agreed. In the meantime, Director Dorey suggested that the briefing documents from all three workshops be posted online, all in a prominent, easy to find location.

The Board discussed the need for public outreach regarding the Project, including issuing a press release to the local news publications, and the appropriate timing for such outreach. The Board discussed the importance of making sure the public is well informed about the Project and has a chance to comment about it prior to any firm decisions being made. President Vásquez suggested that when the item is agendized for Board action to include in the description that the matter to be considered by the Board has to do with the potential replacement of the Vista Flume at a cost in excess of $100 million.

8. COMMENTS BY GENERAL MANAGER

Mr. Hodgkiss informed the Board that the General Manager of the Metropolitan Water District, Jeff Kightlinger has announced that his is going to step down (retire) from his position at the end of 2020. Mr. Hodgkiss also announced that just over two inches of rain fell at Lake Henshaw, adding approximately 70-acre feet of water to the lake.

9. ADJOURNMENT

There being no further business to come before the Board, at 11:10 a.m. President Vásquez adjourned the meeting.

Richard L. Vásquez, President

ATTEST:

Lisa R. Soto, Secretary
Board of Directors
VISTA IRRIGATION DISTRICT

VISTA IRRIGATION DISTRICT

STAFF REPORT

Agenda Item: 6

Board Meeting Date: **March 11, 2020**
Prepared By: **Randy Whitmann**
Approved By: **Brett Hodgkiss**

SUBJECT: WATER SUPPLY PLANNING STUDY

RECOMMENDATION: Conduct Water Supply Planning Study workshop.

PRIOR BOARD ACTION: On April 18, 2019, the Board participated in the first workshop to review and reach preliminary consensus on the project objectives, evaluation criteria and 'long-list' of alternatives to advance to a course screening analysis. On August 8, 2019, the Board participated in the second workshop to review the preliminary results of the course screening analysis and provide input on the recommended 'short-list' of alternatives to advance to the final fine screening process.

FISCAL IMPACT: Flume replacement is estimated to cost $120,000,000 and be the least costly water supply alternative for the District. The cost comparison in the study is as follows:

Option	First-Year Unit Cost	30-Year Present-Worth Cost
To Flume	$2,000/acre-foot	$240 million
Not To Flume	$2,200/acre-foot	$350 million

SUMMARY: The District maintains capacity rights from two sources, raw water treated at the Escondido-Vista Water Treatment Plant (EVWTP) located at Lake Dixon and multiple treated water connections along the San Diego County Water Authority's aqueducts. To reduce costs, the District typically maximizes the locally treated water supply at EVWTP and relies on the 11-mile Flume for conveyance into the District. During a planned 10-day shutdown along the Second Aqueduct, the District is dependent on the Flume. With the Flume approaching its useful life, completing the Water Supply Planning Study will evaluate replacing the Flume and other potential alternatives.

DETAILED REPORT: The Water Supply Planning Study is designed to support a decision by the District as to the future of the Flume. Many factors weigh in the comparison of alternatives. The evaluation of alternatives related to replacing the Flume will seek to account for the full current and future cost of the District's local water supply operation as well as the benefits to the District afforded by access to and management of its own local water supply. Likewise, the analysis of alternatives related to retiring the Flume altogether will seek to account for the current and future costs of purchasing additional imported water, the possible need for additional treated water storage and/or other delivery reliability improvements, the future of the Boot and Bennett areas, and options to exchange the District's local water. The comparison of alternatives and the selection of a preferred alternative is guided by criteria of costs, reliability, water quality, environmental protection, existing water supply obligations and assets, and other factors.

The attached review package summarizes the final fine screening analysis performed on the 'short-list' of alternatives; the workshop will afford the Board the opportunity to provide input on the findings and select a preferred project alternative for implementation.

ATTACHMENTS: Workshop Agenda and Reference Materials

AGENDA

VID Water Supply Planning Study

Board Planning Workshop No. 3
Fine Screening: Findings, Recommendations, and Next Steps

9:00 a.m. Wednesday March 11, 2020

VID Offices

PURPOSE:

- Review results of Fine Screening, with an emphasis on what has changed from Coarse Screening
- Review project recommendations and Next Steps for project implementation

AGENDA:

1) INTRODUCTION
    a. Summary: Why the balance tips To Flume, and what that means for the District
    b. Refresher: Study overview and highlights of Board Workshops 1 and 2
    c. Workshop purpose

2) FINE SCREENING FINDINGS
    a. Box 3: Raw Water System and Treatment
    b. Box 4: Local Water Exchange Options
    c. Box 2: System Improvements / Boot and Bennett
    d. Box 1: Flume Rehab/Replacement Findings
    e. Initial Conclusions
    f. Sensitivity Analysis
    g. – Variables and scenarios that alter the balance scale

3) NEXT STEPS FOR PROJECT ADVANCEMENT
    a. Next Steps for Not To Flume option
    b. Next Steps for To Flume option
    c. Offramps and Opportunities

4) ACTION ITEMS

5) ADJOURNMENT

VISTA IRRIGATION DISTRICT

Water Supply Planning Study

Workshop No. 3 Briefing Document – FINE SCREENING

February 2020

Prepared by:

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

Water Supply Planning Study

Workshop No. 3 Briefing Document – FINE SCREENING

February 2020

Prepared by:

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

In association with:

Brown AND Caldwell

DLM ENGINEERING, INC

HDR

Ken Weinberg Water Resources Consulting

Richard Haberman, P.E. Consulting Engineer

Hoch Consulting

Douglas P. Gillingham

Doug Gillingham, P.E., BCEE
Project Manager

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Joseph Hinden

VISTA IRRIGATION DISTRICT (DISTRICT)

STAFF:

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Don Smith, P.E., Director of Water Resources
Mark Saltz, Water Resources Specialist
Richard Larson, Henshaw Superintendent
Marlene Kelleher, Director of Administrations
Brett Hodgkiss, General Manager

BOARD OF DIRECTORS:

Richard Vasquez – Division 2 (President 2020)
Jo Mackenzie – Division 5 (President 2019)
Patrick Sanchez – Division 4
Paul Dorey – Division 3
Marty Miller – Division 1

Thank you also to the following for providing valuable data and information for use in the Study:

City of Escondido (Escondido):

Chris McKinney, Lori Roundtree, Angela Morrow, Reed Harlan, Darren Southworth

Rincon del Diablo Municipal Water District (Rincon del Diablo):

Clint Baze, Karen Falk

Vallecitos Water District (Vallecitos):

James Gumpel

San Diego County Water Authority (Water Authority):

Chris Clemmons, Chris Castaing

CONTENTS

FIGURES

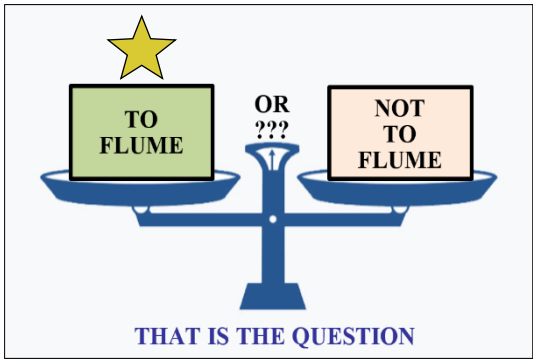
1. Overview / Introduction

Summary:

- **To Flume Ascendant:** At the Fine-Screening level of assessment, the balance scale tips in favor of the To Flume option. This is true even though the option will entail a capital investment on the order of $120 million.
- **Board Workshop No. 3:** The workshop will review the key findings of Fine Screening, and explore the sensitivity of the findings to assumptions about current and future conditions.
- **Next Steps:** Should the District elect to proceed with the To Flume option, its next steps would be to undertake a detailed alignment investigation, environmental documentation, and financial planning.

1.1. The balance scale tips in favor of To Flume.

At the conclusion of the fine-screening level of review, the Flume balance scale, which had been relatively even at the end of coarse screening, now tips in favor of the **To Flume option.** Considering present-worth costs over the next 30 years and beyond, the To Flume option achieves cost savings of more than 30 percent in comparison to the Not To Flume option and also scores favorably on non-cost evaluation factors. We'll provide more detail in the body of this document, but here are a few summary points to keep in mind:



- **Significant capital investment required:** The finding in favor of To Flume holds even though the option entails a capital investment on the order of $120 million. Costs for the Not To Flume option, driven in large part by the need to purchase additional water from the Water Authority at progressively increasing rates, are even higher.
- **The finding is sensitive to assumptions:** The balance scale is sensitive to many project variables for which a change in assumptions could tip the outcome. We'll review the most significant of those sensitivities with you later in the document.
- **Next Steps, Commitments, and Offramps:** The District's next steps will be to undertake advanced planning for either a Flume Replacement Project (To Flume) or retirement of the Flume and a transition to full reliance on Water Authority deliveries (Not To Flume). Should that work identify costs or conditions different than presented here, the District will have the option at that time to revisit and refine the direction as appropriate.

1.2. Here is a summary of what has changed subsequent to the previous round of review.

Fine-Screening Key Changes and Updates

Topic	Change / Update	Significance
Long-Term Financial Analysis	• Thirty-Year Cost Analysis: In addition to examining the First-Year costs of each option, the analysis now presents a 30-Year net-present-value cost review. • Differences in Cost Escalation Rates: The 30-year review accounts for differences in cost escalation rates. 30-year financing of a Flume Replacement project would utilize level payments that do not increase over time. In comparison, we project Water Authority rates will escalate at a rate faster than inflation. • Interest Rates: We have researched the availability of State and Federal low-interest loans, and concluded a Flume Replacement Project would be a likely recipient, thereby lowering the District's cost of capital.	The changes provide a more complete picture of the District's long-term costs for each option. This accounting is to the significant advantage of the To Flume option.
Local Water System (Box 3)	• Confirmation of Approach: We have consulted with a national level Asset Management expert relative to budgeting approaches, a national dam expert relative to long-term cost exposure at Henshaw Dam, and with Escondido's Canal Maintenance Superintendent relative to long-term maintenance of the Escondido Canal.	The additional reviews have provided overall confirmation of our budgeting approach. Costs have increased, but not significantly.
Local Water Exchange Options (Box 4)	• Limitations on Available Exchange Partners: The District has determined the Settlement Agreement restricts the list of eligible exchange partners, leaving Escondido as the only practicable partner. • Escondido Exchange Prospects: The District has worked with Escondido to review exchange opportunities and prospects for a Local Water Purchase agreement. An agreement appears achievable, but water treatment and demand constraints would leave Escondido able to utilize only a portion of the District's allocation.	The changes reduce the cost recovery potential for the Not To Flume option, increasing its overall cost.
System Improvements (Box 2)	• Incorporation of Pumping Cost Savings: The analysis now includes the pumping cost savings the District would realize with the Not To Flume option.	Provides a modest cost credit to the Not To Flume option
Flume Replacement Options (Box 1)	• Hybrid Alignment Lengthened / All-New Alignment Appears Preferred: We reconfigured the Hybrid alignment, including bypassing the Borden bench, adding length and cost to the alignment. At this conceptual level of review, an All-New alignment now appears preferred. Actual alignment determination would be made as part of a subsequent Alignment Study and Environmental Documentation process. • Confirmation of Costs and Use of Welded Steel Pipe: We undertook additional review of pipeline costs and pipe materials, and confirmed the use of welded-steel as the most appropriate pipe material as a basis for our planning-level cost estimates of the project.	Cost estimates for a Flume Replacement project remain relatively unchanged, at approximately $120 million.

1.3. Refresher: The primary goal of the project is to answer the To Flume or Not To Flume question. The evaluation criteria in play mirror the District's mission statement (economy, reliability, quality), and the long-list of initial alternatives is comprehensive.

BACKGROUND AND OVERVIEW

The Vista Flume (Flume) is nearing the end of its functional service life. The Flume is an integral component of the District's water supply system, providing for delivery of the District's historical rights to water from the San Luis Rey River to the District service area. Local water is blended with raw imported water and treated at the Escondido-Vista Water Treatment Plant (EVWTP), where it feeds the Flume.

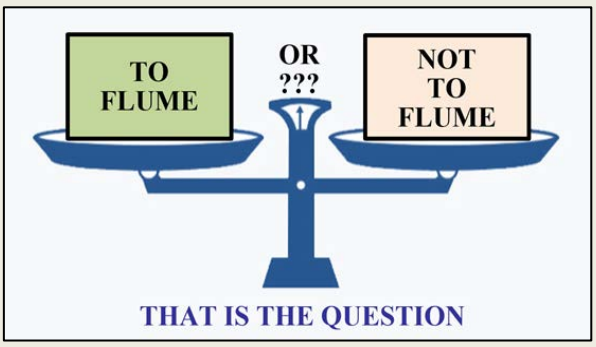
The capital investment needed to replace or rehabilitate the Flume will be significant. Accordingly, prior to making an investment decision, the District wishes to weigh carefully the merits of investing in the Flume against the merits of other water supply alternatives, including that of retiring the Flume altogether and relying on deliveries from the Water Authority in its place. To support its decision, the District is conducting the Water Supply Planning Study to develop an objective and complete evaluation and comparison of alternatives.

PROJECT OBJECTIVES

The goals of the study are as follows:

1) **Alternatives Evaluation (To Flume or Not To Flume):** Identify and evaluate alternatives for rehabilitating or replacing the Flume, and weigh these against alternatives for retiring the Flume, including options for exchanging the District's local water.

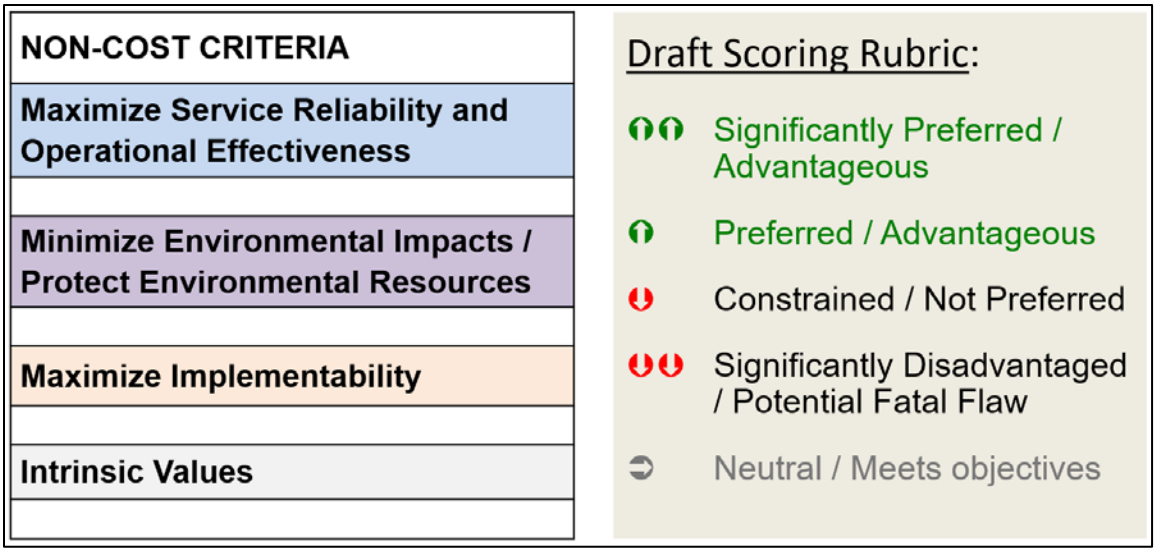
2) **Decision Support:** Provide analysis and recommendations that are clear, complete, and objective, and conduct planning workshops with District staff and the Board to facilitate project understanding and support the District's decision process.



The overarching question. The principal goal of the Water Supply Study is to weigh the alternatives and answer the question, and to do so based on analysis that is clear, complete, and trusted.

EVALUATION CRITERIA

The study will weigh both cost and non-cost factors of the To Flume and Not To Flume alternatives. Costs will be a significant driver of preferences, but non-cost factors of service reliability and operational flexibility, water quality, environmental protection, agency relationships, and other factors will weigh on the balance scale. Evaluation criteria established at the beginning are subject to refinement as the study progresses. Non-cost criteria are summarized in the graphic below.



Many of the non-cost factors can be at least partially equalized between alternatives with additional costs. For example, the potentially negative service reliability aspects of a Not To Flume alternative, in which the District would no longer be largely immune from the effects of Water Authority treated water aqueduct shutdowns, can be mostly overcome with capital and operational expenditures to provide additional treated water storage or other reliability enhancements. This has the consequence of raising the profile of costs as an evaluation factor.

LONG-LIST ALTERNATIVES

The list of alternatives is summarized in the Investigation Box graphic in **Section 1.4.** At Workshop No. 1, the Board asked that the long-list also include consideration of the following:

- Out-of-the-box, comprehensive, holistic consideration of possible project configurations and of possible deals and arrangements with other agencies, e.g. exchange with other member agencies or the Water Authority, exchange via groundwater recharge, etc.
- Adherence to the District's Mission Statement
- Careful consideration of the domino effect of a Not To Flume (e.g. cost of stranded assets, impact to other agencies, other uses for local supply, etc.)
- Consideration of alternative Flume capacities

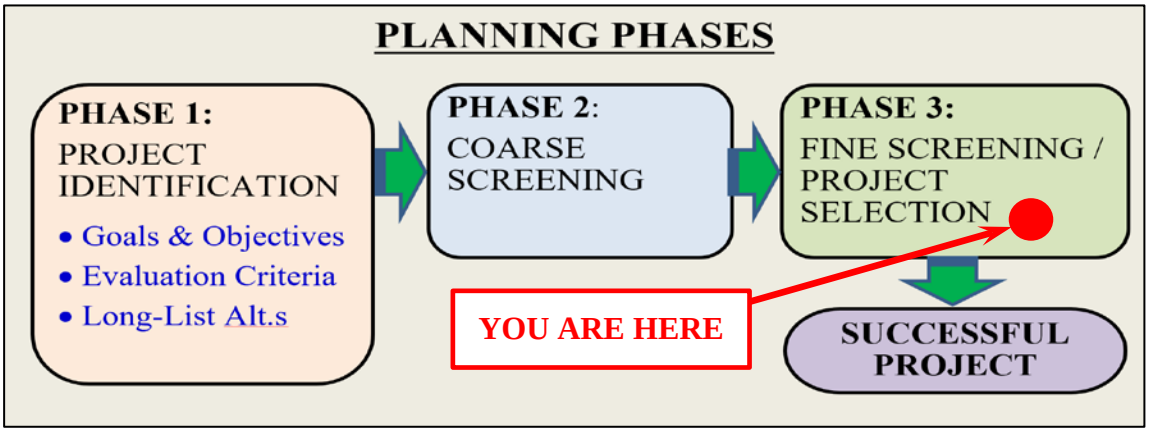
These requests have been incorporated into the Coarse and Fine Screening reviews.

1.4. Study Process: The study is organized into four Investigation Boxes, and sequenced into three phases. Workshop No. 3 will review the results and recommendations of the final study phase, fine screening.

WATER SUPPLY STUDY INVESTIGATION BOXES

Box 1: Flume Rehab Options	Box 2: System Improvements (w/o Flume)	Box 3: Raw Water Supply/Treatment (w/ and w/o Flume)	Box 4: Local Water Exchange Options (w/o Flume)
			
Contents: • **Alternatives:** o HDPE Reline o New pipe in place o New pipe, new alignment o Mix and match o Other • **Sizing / Capacity** • **Hydraulic Design** (options to pressurize) • **Demolition** (of retired Flume sections, if any)	Contents: • **10-Day Outage reliability options:** o Water Authority isolation valves o New treated water storage o Weese supply o Vallecitos supply o Other • **Boot and Bennet** o Transition to Vallecitos o Other • **PS Avoided Costs**	Contents: • **Differences between w/ and w/o Flume options:** o Warner Ranch o Henshaw dam o Escondido Canal o EVWTP o Settlement obligations o Etc.	Contents: • **Exchange Alternatives:** o Escondido (raw) o Rincon del Diablo (treated) o Other (treated) o Water Authority (raw) o Indian Bands (raw) o Environmental (raw) o Other • **EV-WTP Blending Requirements**

Categorizing the issues / structuring the analysis. The study contains more than the usual number of moving parts. To manage the complexity of the charge, the study has organized the analysis into four main Investigation Boxes as listed above.



1.5. Water Authority water rates play a key role in the Study. Those rates are likely to escalate faster than inflation.

The Water Authority's average "All-In" treated water rate for calendar year 2020 is $1,686 per acre-foot ($/AF), which for planning purposes we will round to an even **$1,700/AF**. This price point provides a useful reference point for the Water Supply Planning Study as we evaluate the costs of other attributes of the District's long-term water supply options and the future of the Flume.

The Water Authority only projects future rates for a five-year forecast window; its most recent forecast for 2023 shows a low-band rate of approximately $1,700/AF (as already reached), and a high-band rate of approximately $2,200/AF.

Work being undertaken by study team member Ken Weinberg Water Resources Consulting is investigating long-term rate forecast scenarios on behalf of a group of Water Authority member agency managers and others. This work indicates that over the long-term, there is more upward pressure on Water Authority water rates than there is mitigating downward pressure. The largest upward pressure is the need to fund fixed costs, including the Water Authority's $1.5 billion outstanding debt and its take-or-pay purchase commitments, on a base of reduced water sales.

Upward and Downward Pressures on Future Water Authority Rates

Upward Rate Pressures (factors favoring higher annual rate increases)	**Downward Rate Pressures** (factors favoring more moderate annual rate increases)
• Reduced sales due to conservation and local supply development • Greater portion of total supply derived from most expensive sources, Desal and IID • WaterFix and other MWD Capital Costs on Transportation rate component • Increasing power costs • Potential Salton Sea Mitigation cost greater that contractual Environmental Cap • Low utilization of Twin Oaks Water Treatment Plant	• IID Transfer purchase price could increase at rate less than CPI • Costs for WaterFix, if implemented, allocated to RTS Charge and not all to Transportation • MWD Treatment Surcharge appears to have stabilized

A preliminary finding of this work is that a reasonable mid-range forecast of Water Authority rates through 2045 shows those rates increasing at an average rate faster than base inflation. This would mean that on a current-dollar, inflation adjusted basis, the long-term average unit cost of Water Authority water is higher than the current $1,700/AF rate.

The Water Authority Board has formed a Fiscal Sustainability Taskforce made up of Board members and member agency managers to better define and address the long range impact that these factors have on Water Authority costs and the rate structure's current ability to equitably manage these expected rate pressures. Metropolitan Water District of Southern California (MWD) has started a similar process as the same factors the Water Authority faces are being faced by MWD. The Water Authority expects its Fiscal Sustainability process to conclude before the end of the current fiscal year. That process should provide greater clarity to member agencies on where Water Authority water rates are trending in the long term.

For the fine screening review, we will utilize the following range of escalation assumptions:

Water Authority Rate Escalation Assumptions

Scenario	Description
Low (Optimistic)	Rates escalate at 1.0% above water system inflation for next 5 years, thereafter at rate of inflation
Mid-Range	Rates escalate at 1.5% above water system inflation the next 10 years, thereafter at rate of inflation
High (Pessimistic)	Rates escalate at 2.5% above water system inflation for next 10 years, thereafter at rate of inflation

1.6. Market interest rates are already low. Project interest rates could be further lowered through State or Federal low-interest loan programs.

The economic comparison of the To Flume and Not To Flume options entails a comparison of merits of capital outlays with long-term annual costs. Equating these two, in terms of Net Present Values or Equivalent Annual Costs, is done based on an interest rate that reflects the District's cost of funds. Lower interest rates decrease the annual costs of capital financing and increase the present-worth value of future annual costs; higher interest rates do the opposite.

The prior coarse-screening review utilized the long-term (30 to 40 years) interest rates summarized in the table below:

District Finance Rates and Terms (Unaided)

Scenario	Description	**Interest Rate** (%/yr)
Low (Optimistic)	Reflects continuation of low interest rates into the future	**3.0**
Mid-Range	Projected mid-range market conditions	**3.5**
High (Pessimistic)	Less favorable market conditions	**4.0**

For the fine-screening review, we have expanded on the previous work by evaluating the project's potential to qualify for and receive low-interest financing through available State and/or Federal programs. The most likely sources for low-interest financing for the project are the State Water Resources Control Board's Drinking Water State Revolving Fund (DWSRF), and the Federal Water Infrastructure Financing Innovation Act (WIFIA) Credit Assistance Program, summarized below:

DWSRF and WIFIA Low-Interest Loan Program Summaries

Program	Description	Interest Rate[1] (%/yr)
DWSRF	Credit assistance for drinking water infrastructure projects. • Up to 100% funding available • Up to 30-year loan repayment term • Fixed interest rate set at 50% of the average interest rate paid by the State on general obligation bonds issued the prior year • No interest payments during construction	**1.4**
WIFIA	Credit assistance for water and wastewater systems. • Up to 49% of total eligible project costs • Up to 35-year loan repayment term • Fixed interest rate tied to treasury securities rate for similar maturity date	**2.3**

1. Interest rates are as of January 2020, and are subject to change

Based on our review, we believe it reasonable to assume the project would be eligible for and would be likely to receive funding from one or both programs. We believe a reasonable mid-range assumption is that the project would be awarded a DWSRF loan covering 50 percent of the project's capital cost, effectively lowering the project's average cost of financing by a considerable margin[1]. Combining Optimistic, Mid-Range, and Pessimistic financial assistance assumptions with the previous market interest rate assumptions results in the following range of project finance rates (Weighted Average Cost of Capital).

Project Finance Rates and Terms Inclusive of Programs

Scenario	Description	Melded Interest Rate (%/yr)
Low (Optimistic)	Reflects continuation of low interest rates into the future, and an optimistic assumption that the project would receive DWSRF funding covering **75%** of project capital costs.	**1.8**
Mid-Range	Reflects projected mid-range market interest rates, and a mid-range assumption that the project would receive DWSRF funding covering **50%** of project capital costs.	**2.5**
High (Pessimistic)	Reflects less favorable market interest rate conditions, and a pessimistic assumption that the project would not be awarded any low-interest loans.	**4.0**

For the fine-screening analysis, we will use the mid-range adjusted rate of 2.5 percent, and an assumed finance period of 30 years. This results in a capital recovery factor (A/P) of 0.0478, meaning that every $1 million in capital financed would incur an annual repayment of $47,800 fixed over the 30-year repayment term.

[1] Actual loan awards are subject to funding availability and to year-to-year variation in the level of competition for available funds, and there is no guarantee the project would be awarded financing.

1.7. We assume most water system costs will inflate at the District's budgeted rate of 3.0 percent per year.

The rate of inflation of water system related costs will affect the economic comparison of the To Flume and Not To Flume options. For a mid-range assumption, we will use the rate used by the District in its budget projections, 3.0 percent per year. Water system cost inflation rates for use in the Study are summarized in the table below.

Water System Cost Inflation

Scenario	Description	Inflation Rate (%/yr)
Low (Optimistic)	Reflects a rate lower than that used by the District in its budget projections	**2.0**
Mid-Range	The rate used by the District in its budget projections	**3.0**
High (Pessimistic)	Reflects a rate higher than that used by the District in its budget projections	**4.0**

1.8. We estimate the long-term average annual yield of the system as currently operated is 5,000 acre-feet per year. The amount is important, and variable.

The delivery of local yield is the primary benefit of the Flume and the primary reason to consider capital investment in Flume rehabilitation or replacement. The average annual yield of the local water system is therefore a key study variable: higher yield averages would warrant additional capital investment, lower yields less.

The study team has worked with District staff to review historical system yields and adjust these to current conditions of District demands, local water blending requirements at EVWTP, terms of the San Luis Rey Indian Water Rights Settlement Agreement (Settlement Agreement), and other factors. Based on this review, we estimate the long-term average annual yield of the system, as currently operated, is 5,000 acre-feet per year (AF/yr). Probable long-term averages, for periods of 50 years and more, are summarized in the table below.

Local System Future Average Annual Yield

Scenario	Description	Yield (AF/yr)
Low	Reflects dryer than historical average hydrology, and continuation of existing local water blend limits at the EVWTP	**4,000**
Mid-Range	Reflects current 60-year average hydrology (1960-2019), and continuation of existing local water blend limits at the EVWTP	**5,000**
High	Reflects one or more of wetter than historical average hydrology, Warner Basin wellfield expansion, and relaxation of local water blend limits	**6,500**

In addition to the yield range presented in the table, the historical record indicates system yield over shorter periods of even thirty years is subject to even wider ranges than in the table. The next thirty years could be a repeat of the driest 30-year period of record, or of the wettest. We'll review the risks and opportunities inherent in this at the upcoming board workshop.

1.9. Document Outline

The remainder of this briefing document is organized into the following five sections. Yes, the Investigation Boxes are out of order . . . bear with us, there's a method to our madness.

2. Local Water System (Box 3)

Summary:

1) Increased investment will be needed for long-term sustainability.
2) System costs on a dollars per acre-foot basis are approximately one-half of the all-in Water Authority raw water cost.
3) Under a Not To Flume alternative, most of the District's system costs would continue unless another party assumed ownership.

2.1. Long-term sustainable maintenance and operations of the local water system will require additional investment beyond current budgeted levels of repair and replacement.

Over the long-term, sustaining the functionality of the local water system requires ongoing maintenance, repair, and sometimes replacement of system components. The District's current budget covers portions of what is needed in the long term, but has deferred some costs while the District was still engaged in negotiation of the Settlement Agreement, and while the District was uncertain as to the future of the Flume. Additional investment will be needed for long-term sustainability.

The study team has taken an Asset Management approach to budgeting for each component category of the system. Applying known conditions, industry experience, and professional judgement, the team has estimated three budgetary levels of investment: low, middle, and high (or optimistic, mid-range, and pessimistic). Some components, including the Escondido Canal, are budgeted for perpetual repair but not replacement; others for replacement on varying intervals. The resulting budgetary levels, inclusive of current budget items, and with accounting for cost-sharing arrangements with Escondido, are summarized in the table below.

Annual Operation, Maintenance, Repair, and Replacement Costs (District Share)

Scenario	Well + Ditches	Henshaw Dam	Escondido Canal (EC)	S.P. Under-grounding[1]	Bear Valley	Other Budget[2]	Total
2019 Budget	$554,000	$214,000	$375,000	$20,000	Included with EC	$459,000	**$1.6M**
A) Low[3]	$795,000	$374,000	$435,000	$956,000	$342,000	$459,000	**$3.4M**
B) Middle[3]	$834,000	$484,000	$455,000	$956,000	$399,000	$459,000	**$3.6M**
C) High[3]	$891,000	$794,000	$477,000	$956,000	$479,000	$459,000	**$4.1M**

1. The scenario costs assume the District's share of costs at $20 million, financed over 30 years at i = 2.5%/yr
2. Includes costs not assigned to a facility such as buildings and grounds, legal services, consultants, and insurance
3. Total spending levels, inclusive of existing budget

The above costs are exclusive of Warner Ranch lease revenues. For this review, we have treated the District's ownership of the Ranch and the revenues it derives as independent of to the Flume or Not To Flume question.

2.2. The costs of the local water system, on a dollars per acre-foot basis, are modest in comparison to imported water costs, and appear affordable over the long term.

Assuming an average annual local yield of to the District of 5,000 AF/yr (see **Section 1.8**), the District's existing budget for the local system equates to approximately $325/AF exclusive of treatment costs. The three asset management ranges increase this cost to a new total of between $670 and $810/AF, exclusive of treatment. Treatment costs at the EVWTP add approximately $200/AF, $250/AF for asset management scenario C. Equivalent unit costs are summarized in the table below.

Summary of Annual Cost Per Acre-Foot of Water Produced

Scenario	Total Annual Cost	Average Yield (AF/yr)	Unit Cost Before Treatment	Average Treatment Cost	Unit Cost With Treatment
2019 Budget	$1,622,000	5,000	$325	$200/AF	**$535/AF**
A) Low	$3,361,000	5,000	$670	$200/AF	**$870/AF**
B) Middle	$3,587,000	5,000	$720	$200/AF	**$920/AF**
C) High	$4,056,000	5,000	$810	$250/AF	**$1,060/AF**

The Middle Range estimate with treatment of **$920/AF** represents a 70 percent increase to existing budgeted spending levels. Nevertheless, viewed in comparison to current "All-In" Water Authority treated water rate of approximately **$1,700/AF**, the local system costs are modest.

2.3. Opportunities to reduce the District's share of local system costs as part of a Not To Flume alternative are limited.

Under a Not To Flume option, the EVWTP volumetric treatment cost component might[2] drop from the tally, but most of the rest of the District's cost obligations for the local water system facilities would continue unless another party assumed ownership of the facilities. This arises in part from the terms of the Settlement Agreement, which requires the parties to operate the local water system as it has been historically, and to deliver water to the Indian Bands when requested. Also, because most of the ongoing costs are fixed, being independent of the volume of water produced and delivered, the mere reduction of the District's use of local water would not alter the costs.

[2] The District's continuing treatment cost obligations if it terminated the Water Filtration Plant Joint Powers Agreement are not clearly defined. Section 8 of the Agreement requires the District to pay 20 percent of the costs of future capital improvements, revisions, and replacements not undertaken to increase Plant capacity. Termination of the Agreement is by mutual consent, so it appears the obligations would be negotiated. We have assumed these negotiations would absolve the District from responsibility for future costs.

2.4. Methodology Notes: Different facilities require different budgeting approaches

The Study team evaluated the District's existing budget levels along with three asset management scenarios for replacing the well field, conveyance ditches, the Hellhole Siphon, and the Bear Valley conveyance facilities upstream of the EVWTP**.** Costs for the Henshaw Dam were estimated by an HDR national dam expert (HDR, 2019). Costs for the Escondido Canal were estimated by combining current repair budgets with estimated extraordinary expenses, and after thorough review with Escondido staff including the Canal team field superintendent. The San Pasqual Undergrounding project converts a portion of the Escondido Canal to a pipeline, as required by the Settlement Agreement.

As shown in the previous table, the District's existing annual investment is approximately $1.6 million, while the three scenarios resulted in costs of between $3.4 and $4.1 million per year. The "Other Budget" column includes buildings and grounds, legal, consultant, and insurance costs in the District's 2019 Budget that were not assigned to a specific facility. This indicates the District should make additional investments in the system. The costs presented in **Section 2.1** are preliminary suggested budgets.

The table below lists the assumptions for the facilities and scenarios.

Table 2: Summary of Assumed Replacement Frequencies and Added Costs

Scenario	Well + Ditches	Henshaw Dam	Escondido Canal	San Pasqual Undergrounding	Bear Valley Conveyance
A) Low	70 Years	Budget	$150,000	$20M, 30 yrs, 2.5%	70 Years
B) Middle	60 Years	30% Replace	$300,000	$20M, 30 yrs, 2.5%	60 Years
C) High	50 Years	100% Replace	$450,000	$20M, 30 yrs, 2.5%	50 Years

In general, Scenario A assumed all facilities are replaced in 70 years, Scenario B 60 years, and Scenario C, 50 years. The Henshaw Dam and appurtenances maintenance, repair, and replacement costs were estimated by HDR based on two reports by Findlay Engineering (2012, 2018) and costs for similar projects. The range of costs was developed based on the damage caused by low, moderate, or extreme earthquakes, floods, or other events. Given the Escondido Canal is generally excavated through rock on the side of a mountain, and through discussions with Escondido, the Canal will likely be maintained and repaired in its existing alignment and not replaced. However, additional budget is warranted to account for occasional extraordinary costs such as failures of sections or replacement of the Hellhole Siphon.

The Bear Valley conveyance facilities include the penstock, power plant, and conveyance facilities to the P1/P2 Pump Station at the headworks to the EVWTP. The cost of the Penstock was taken from the 2004 replacement project escalated to current costs. Cost of the Power Plant was taken from damages paid to Escondido in 1983 as a result of flooding.

Costs for the wellfield and ditches are shared by Escondido, which reimburses the District for 35.2 percent of these costs.

The following table summarizes the facility maintenance and replacement assumptions of asset management scenarios A, B, and C.

Raw Water Facility Operation, Maintenance, Repair & Replacement Costs

System Component	ASSET MANAGEMENT ASSUMPTION SETS [1] (Additional Costs Beyond Current Budget Levels)		
	A) Low (Optimistic) Current + 70-Year Replacement + Historical Extraordinary	**B) Middle Ground** Current + 60-Year Replacement + Historical Extraordinary	**C) High (Pessimistic)** Current + 50-Year Replacement + Historical Extraordinary
a) Well Field	Replace within 70 Years or 1 New Well per 4.4 Years	Replace within 60 Years or 1 New Well per 3.8 Years	Replace within 50 years or 1 New Well per 3.1 Years
b) Ditches	Replace within 70 Years or 1,300 Feet per Year Average	Replace within 60 Years or 1,520 Feet per Year Average	Replace within 50 Years or 1,820 Feet per Year Average
c) Henshaw Dam	Current Expenses	Current + 30% of Replacement Cost	Current + 100% of Replacement Cost
d) Diversion Dam	$50,000 Extraordinary Expense Every 5 Years	$100,000 Extraordinary Expense Every 5 Years	$150,000 Extraordinary Expense Every 5 Years
e) Escondido Canal	$150,000 Extraordinary Expense Every 20 Years	$300,000 Extraordinary Expense Every 20 Years	$450,000 Extraordinary Expense Every 20 Years
f) Rincon Penstock	No District Responsibility	No District Responsibility	No District Responsibility
g) Bear Valley Penstock	Replace within 70 Years	Replace within 60 Years	Replace within 50 Years
h) Bear Valley Power Plant	Replace within 70 Years	Replace within 60 Years	Replace within 50 Years
i) Conveyance to EVWTP	Replace within 70 Years	Replace within 60 Years	Replace within 50 Years

(1) The age and condition of existing facilities vary. A typical life of 50 to 70 years for water facilities was assumed to develop a range of annual costs. Replacement costs for pipelines and wells are based on current cost to construct. Replacement costs for 1) Henshaw Dam based on the 1981 Buttress Cost, 2) Bear Valley Penstock based on the 2004 replacement cost, and 3) Bear Valley Power Plant based on the 1983 costs of damages from flooding. We have assumed the Escondido Canal would not be replaced but would be rehabilitated and repaired as needed.

3. Local Water Exchange Options (Box 4)

Summary:

- The Settlement Agreement limits the list of possible exchange partners to the Agreement parties.
- It appears likely the District could strike a mutually beneficial exchange deal with Escondido, but Escondido would be able to utilize only a portion of the District's allocation.
- The net economic benefit to the District would cover only a portion of the District's local system costs, and would not generate any additional revenue to offset Flume replacement costs.

3.1. The Settlement Agreement effectively leaves Escondido as the District's only practicable exchange partner.

A key component of the Study's investigation of the Not To Flume option has been the evaluation of possible local water exchange agreements, under which the District would lease or exchange its allocation of local water to a partner agency. The Study's original scope of work presumed a long list of agencies with whom the District might be able to negotiate such an exchange agreement. We reported such during the Coarse Screening review, noting however that:

- the opportunities were constrained by the need for expensive conveyance facilities;
- none of the target agencies had been beating down our door to sign on; and
- Escondido appeared to be the most promising candidate.

Subsequent to the Coarse Screening review, the District has confirmed its position that the Settlement Agreement limits the use of local water to the sole and exclusive use of the Agreement parties. This constrains the list of potential exchange partners to Escondido and the Indian Bands. Because the Coarse Screening review had already determined that an exchange agreement with the Indian Bands was unlikely to generate revenue[3] for the District, this leaves Escondido as the only practicable exchange partner.

[3] The Settlement Agreement defines the Indian Bands' water entitlements and effectively removes any incentive for them to pay for such a transfer. The transfer is certainly possible, but not in a manner that would generate revenue for the District.

3.2. Opportunities exist for a win-win exchange agreement with Escondido.

Under a possible exchange agreement with Escondido, Escondido would purchase some or all of the District's allocation of local water at a price less than what it would pay for raw water from the Water Authority. The District in turn would benefit by selling its water at a price higher than its unit cost of the local water system. If the parties were to split the benefits, the District's sales price to Escondido would be as presented in the table below.

Local Water Purchase Agreement Sales Price Example

	Description	Unit Cost
District Local System Costs	District mid-range costs for long-term operations, maintenance, and replacement of the local water system, per **Section 2.2**	$720/AF
Water Authority Raw Water Purchases	Water Authority's All-In price for raw water, CY 2020. Escondido would avoid this cost for every acre-foot it purchased from the District.	$1,400/AF
Possible Sales Price	The sales price could be set at the mid-point of the District's unit costs of the local system, and Escondido's avoided cost of Water Authority raw water purchases. This is just an example; actual price TBD.	**$1,060/AF**

In early December of last year, the District sent a white paper to Escondido outlining the terms and benefits of a possible Local Water Purchase Agreement that could be implemented if the District were to proceed with the Not To Flume option. Subsequently, District staff met with Escondido staff to provide background on the Flume study, answer questions about the white paper, and explore Escondido's interest in advancing the development of a purchase agreement. The results of those discussions are summarized below:

- **Need for Careful Review:** Escondido staff advised that any agreement would be subject to considerable Escondido review, including legal review and careful evaluation of the costs and conceptual terms presented by the District.
- **Schedule for Review:** Escondido staff suggested the depth of review needed would require more time than available in advance of the Study's Workshop No. 3 Board meeting. Staff suggested the District proceed with its schedule using its best assumptions, and that should the District Board elect to pursue a Flume retirement option, the parties could then undertake further review and negotiations.
- **Prospect for Review:** Escondido staff advised that they were unable to offer an official Escondido position on the likelihood of an agreement, but noted that if in fact there were opportunities for Escondido to save money in the long-term, and without incurring exposure to new liabilities, then this seemed reasonable cause for Escondido to engage in good-faith review and negotiations with the District in pursuit of a deal.

In addition, Escondido noted that owing to the need to limit the blend of local water at the EVWTP to no more than 40 to 50 percent of total plant inflow, and owing to projected declines in its potable water demands, it was unlikely to be able to utilize the District's full allocation of local water. This reduces the net economic benefit available to the District, as described below.

3.3. The District's net economic benefits of an exchange agreement are limited by Escondido's inability to utilize all of the District's local water allocation.

As noted, the combination of local water blending requirements at the EVWTP, and Escondido's projected declining potable water demands, limits Escondido's ability to utilize the full amount of the District's local water allocation. Absent significant improvements in water quality at Lake Wohlford, or treatment capabilities at the EVWTP, or both, these limitations will result in Escondido being able to utilize at most approximately one-half of the District's allocation.

The table below summarizes our assessment of unit revenues available from an Escondido water purchase agreement. Our mid-range expectation is that an agreement would cover approximately 60 percent of the District's local water system costs. As described in **Section 2.2**, the District's mid-range unit cost for the local water system, exclusive of treatment costs, is approximately $720/AF.

Water Purchase Agreement Revenue Projections

Scenario	Description	Unit Revenue[1]
Low (Pessimistic)	• Escondido average annual utilization: 1,500 AF/yr. • Unit Purchase Price: mid-point between local water system costs and Water Authority rate, per **Section 3.2**.	**$320/AF**
Mid-Range	• Escondido average annual utilization: 2,000 AF/yr. • Unit Purchase Price: mid-point between local water system costs and Water Authority rate, per **Section 3.2**.	**$420/AF**
High (Optimistic)	• Escondido average annual utilization: 2,500 AF/yr. • Unit Purchase Price: mid-point between local water system costs and Water Authority rate, per **Section 3.2**.	**$530/AF**

1. Unit revenues are expressed on the basis of the District's full 5,000 AF/yr of average annual yield.

4. System Improvements Without Flume (Box 2)

Summary:

For a Not To Flume option, the following findings apply:

- Delivery reliability concerns will be largely mitigated by a planned Water Authority isolation valve project, such that large volumes of new treated water storage will not be required.
- The Boot and Bennett areas would transfer to Vallecitos, with the District incurring significant annexation and capacity fees.

4.1. The delivery reliability consequences of a Not To Flume option will be largely (but not entirely) mitigated by a planned Water Authority isolation valve project.

During Water Authority aqueduct shutdowns, the District has always relied on the Flume to maintain full delivery reliability to the District service area. Retirement of the Flume would require compensating measures to maintain appropriate levels of delivery reliability.

The District's 2017 Master Plan identified possible compensating measures to maintain reliability with the Flume retired. Among the measures was the prospect of needing to construct up to 70 million gallons of new treated water storage, at a concept-level cost of up to $100 million. Upon further review, the study team has determined that other alternatives identified in the Master Plan will be able to compensate for the loss of the Flume at much more modest costs.

The primary mitigation for the loss of the Flume will be the Water Authority's planned Aqueduct Isolation Valve Project. With the proposed valves in place, the Water Authority will be able to limit future scheduled treated water aqueduct shutdowns to one or the other of the two treated water aqueduct pipelines south of Twin Oaks, maintaining full service to the District.

Although the isolation valve project will provide mitigation for scheduled aqueduct shutdowns, it still leaves the District at a disadvantage during rare *unscheduled* outages resulting from aqueduct facility failures and other catastrophic events. In these situations, the District could be reliant on its treated water storage, its access to water from the Oceanside Weese Water Treatment Plant, and its interconnections with Vallecitos for periods of up to 10 days. To supplement these capabilities, the study team recommends the District upsize its planned Pechstein II reservoir by approximately 10 million gallons beyond the capacity it would otherwise build, at an additional cost of approximately $15 million.

Delivery reliability compensation measures are summarized in the table below. The Water Authority isolation valve project is the linchpin of the package of mitigation measures. The other measures marked as "Included in Option" in the rightmost column are supplemental to the isolation valve project, to address unscheduled aqueduct outage scenarios not fully addressed by the isolation valve project. We recommend all measures so indicated be included as components of the Not To Flume option.

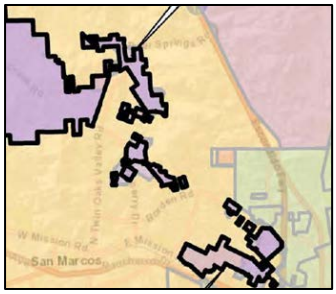
Delivery Reliability Compensation Measures (for Not To Flume Option)

Option	Description	Included in Option?
Water Authority Aqueduct Isolation Valves[1]	Will allow Water Authority to operate the Twin Oaks Water Treatment Plant during a treated water shutdowns, with supply south continuing via one or the other of P3 and P4. This would immunize the District from the effects of scheduled treated water shutdowns.	**Yes.** Project had originally been planned for Water Authority 2020-21 budget cycle, but was deferred during budget review. The District should continue to monitor status and encourage timely project implementation.
District Treated Water Storage[1]	Build treated water storage to compensate for loss of Flume deliveries. Assuming Water Authority isolation valve project proceeds, need for additional treated water storage is modest. Assume 10 MG addition to District's planned Pechstein II reservoir.	**Yes.** Include 10 MG at cost to District of **$15M.**
Oceanside Weese Water Treatment Plant[1]	The District can access up to 5 mgd by agreement, and likely more in an emergency.	**Yes.** If District selects Not To Flume option, it should consider updates and/or revisions to existing agreement.
Interagency Connections[2]	The District has emergency interties in place, the most significant being with Vallecitos. Availability to the District during a shortage or emergency would likely be limited by agencies prioritizing service to their own customers.	**Yes.** Additional arrangements unnecessary with above measures.
New Water Treatment Plant at Pechstein	The District would build a new water treatment plant adjacent to Pechstein, served by a new raw water connection to the Second Aqueduct. Reliability benefits beyond above measures would be minimal, as the same catastrophic events causing outages of the treated pipelines would also likely affect the raw water pipeline.	**No.** Project costs appear unwarranted assuming above measures in place.

1. The District's existing agreement with the City of Oceanside (Oceanside) provides the District access to up to 5 mgd of capacity from the Weese plant, but only on a surplus, "as-available" basis. Oceanside's projected usage of the plant indicates a high likelihood of surplus capacity remaining available for use by the District, but there remains the possibility Oceanside demands could increase or that the city could commit its surplus capacity to others (including the Rainbow Municipal Water District) through agreements. Additional capacity beyond the 5 mgd limit of the current agreement may be available during an emergency situation, but this is not guaranteed.
2. Vallecitos maintains considerable treated water storage reserves, and also has direct access to supply from the Water Authority's Carlsbad Seawater Desalination Facility. Vallecitos would naturally prioritize use of these assets for service to its own customers, but there could be emergency situations where a share of these assets could be made available to the District.

The full package of compensation measures would provide adequate delivery reliability safeguards for the District, although possibly not quite to the level of delivery redundancy provided by the Flume in combination with the District's treated water connections. This diminishment of delivery reliability is scored as a Non-Cost Evaluation Criteria factor later in **Section 6**.

4.2. The Boot and Bennett areas would transfer to Vallecitos, with the District incurring significant annexation, capacity, and infrastructure transfer fees.



The Boot and Bennett areas of the District service area are dependent on deliveries from the Flume, with backup service available from Vallecitos. Although in the District service area, these parcels are within the Local Area Formation Commission (LAFCO) designated sphere of influence of Vallecitos, meaning that LAFCO favors their eventual transfer to Vallecitos. In recent years, some parcels in the Boot area have annexed to Vallecitos at the behest of the parcel owners in order to obtain sewer service for planned development, and with all transfer costs paid by the property owner. The District anticipates this trend will continue, with most of the Boot area eventually transferring to Vallecitos service at no cost to the District.

If the Flume were retired, the presumption is that the Boot and Bennett area reorganization process with LAFCO and Vallecitos would be accelerated, and that the District might incur significant costs for annexation, capacity, and infrastructure transfer fees.

District staff has conducted a high-level assessment of the situation, and conferred with the study team on their findings. Based on that preliminary review, the study will utilize the following cost range for the transfer:

Boot and Bennett De-annexation Costs to District

Scenario	Description	Cost		
		Boot	Bennett	Total
Low (Optimistic)	Vallecitos waives capacity and annexation fees, but District and Vallecitos split infrastructure transfer fees.	$2M	$4M	**$6M**
Mid-Range	Vallecitos and District split annexation, capacity, and infrastructure fees.	$5M	$12M	**$17M**
High (Pessimistic)	District pays full annexation, capacity, and infrastructure fees	$9M	$24M	**$33M**

The District has also considered the following two options for maintaining service to the Boot and Bennett areas:

- **Extend District facilities:** The District has determined that extension of District facilities to serve the areas independent of the Flume would be impractical to due cost and other factors. LAFCO has placed the areas within the Sphere of Influence of Vallecitos.
- **Interagency Service Agreement with Vallecitos:** The District has determined that permanent service to these areas by Vallecitos, while keeping the areas within the District, is unlikely due to Vallecitos disfavoring such an arrangement. Notwithstanding Vallecitos's stated position, this option has successful precedent elsewhere in the County of San Diego and staff still believes the option is worth keeping alive.

4.3. The Not To Flume option would reduce the District's pumping costs.

The existing Flume feeds the District's central storage reservoir, Pechstein, at a high water elevation of 837 feet (above sea level). During normal operations with the Flume in service, the District pumps water out of Pechstein to its 976 / 984 zone, which in turn feeds the 900 zone. This constitutes the bulk of the District's pumping, both by volume and by cost.

If the Flume were retired from service, as under the Not To Flume option, the District would replace deliveries from the Flume with increased purchases at its VID3 connection to Water Authority pipelines 3 and 4 in the Second Aqueduct. Water delivered at the VID3 connection can feed the District's 976 / 984 zone by gravity, substantially reducing the District's pumping costs. Pumping cost savings are summarized in the table below.

Summary of Avoided Pumping Costs (Not To Flume Option)

Component	Description	Unit Cost Savings
Power	Based on recent historical operations, the District estimates it would reduce its pumping power consumption by approximately 765,000 kWh per year, which at an average total cost of $0.17/kWh amounts to approximately $130,000/yr of cost savings.	$25/AF[1]
O&M	In addition to power costs, the District estimates it would realize other O&M cost savings of approximately $80,000/yr.	$15/AF[1]
Capital	The District estimates it would avoid approximately $5M in future capital costs for pump station rehabilitation and replacement.	$50/AF[2]
Total		**$90/AF**

1. Unit revenues are expressed on the basis of the District's 5,000 AF/yr of average annual yield
2. Capital costs are amortized at 2.5 percent over 30 years (A/P = .0478), and converted to unit cost using the District's 5,000 AF/yr average annual yield of the local water system.

5. Flume Replacement Options (Box 1)

Summary:

- Achieving a long-term Flume replacement will be an even larger and more expensive endeavor than previously thought. This is because:
  - Most of the bench sections cannot be economically rehabilitated or replaced in their existing easements.
  - The age of many of the siphon sections is such that they must be presumed to require structural rehabilitation or replacement over the 50-year planning horizon.
- An All-New option, entailing an entirely new pipeline in a new alignment, appears preferred both economically and operationally.
- Final decisions on the alignment of a Flume Replacement Project would be undertaken during a subsequent Alignment Study.

5.1. Rehabilitating/Replacing the Flume will require a substantial capital investment.

We wish we could report otherwise, but achieving a long-term Flume rehabilitation or replacement will be an expensive proposition for the District, perhaps representing its largest capital investment ever.

Previous cost estimates extrapolated from the MW Bench high-density polyethylene (HDPE) slip-lining project, the Baumgartner Bench replacement, and other data points to generate a construction cost range of 35 million to 75 million dollars. That analysis was predicated on two key assumptions: 1) that HDPE slip-lining would be found feasible for most of the bench sections, and 2) that the siphon sections would require new mortar lining but little additional work. Upon further review, and with consideration to the project objective of achieving a long-term Flume replacement, **we find that both assumptions need to be abandoned**. Further details are provided in the subsections that follow.

5.2. The existing concrete bench structures are unsuitable for reuse and will need to be demolished.

The concrete canals that make up the bench sections of the Flume were old and decaying the last time the District looked at them in 2012, and they are even older and more decayed now in 2020. Roof sections are structurally weak and separating from the sidewalls, floor sections are being

undercut by erosion, and whatever tiny amount of steel that was included in the original construction has corroded.

Not suitable for reuse. Left: Roof separation, Borden Bench; Right: Erosion under Daley Bench

The study team has consulted with structural engineers, condition assessment experts and District staff. Based on this review, our preliminary conclusion for coarse screening is that the bench structures have no reliable usable strength remaining, and are not suitable for reuse as part of a long-term Flume replacement project. The structures will need to be demolished.

5.3. Most of the bench section easements are so poorly suited for pipeline construction that it will be more economical to bypass them with pipelines in roads.

Even with the existing concrete bench structures unsuitable for reuse, the bench easements themselves provide a path for construction of a new pipeline. However, for many of the bench section easements, pipeline constructability is hampered by limited and difficult access, constrained working space, rock outcroppings, and other difficulties. For these sections, the study team has determined it will be more economical to vacate the existing easement and construct new pipeline in roads, bypassing the bench sections. For other bench sections the opposite holds, with pipeline construction within the existing easement preferred over available bypass routes.

Challenging Construction Conditions. Narrow access & tight bends on: Left: Tunnel Bench, and Right: Twin Oaks Bench

This mixing and matching of bench segments and bypasses gives rise to what we term the Hybrid alignment alternative. More on that in a minute.

Our preliminary constructability assessment of each bench section is summarized in the table below:

Bench Section Constructability Assessment Summary

Bench*	Length (ft.)	Age (yrs.)	Constructability Notes	Use or Bypass?
Jack Creek	490	94	Assume aboveground pipeline due to rock conditions. Reach will be difficult to construct, but is short and achievable. Bypass route would add considerable distance.	**Use**
Tunnel	3,765	94	Difficult access and slope conditions with tight bends. A bypass spanning both Tunnel and Daley appears preferred.	**Bypass**
Daley	3,340	94	Difficult access and slope conditions with tight bends. A bypass spanning both Tunnel and Daley appears preferred.	**Bypass**
Kornhauser	1,325	94	Difficult access, from one side only. Bypass via future development preferred.	**Bypass**
Finkbinder	3,895	94	Tight bends. There is a preferred bypass route nearby. Use with above-grade piping could be an alternative.	**Bypass**
MD	3,275	94	Tight bends. There is a preferred bypass route nearby spanning both MD and Pearson benches.	**Bypass**
Pearson	370	94	Short reach. There is a preferred bypass route nearby spanning both MD and Pearson benches.	**Bypass**
Beehive	470	94	Easy access and short reach. Replace-in-place with buried pipe assumed.	**Use**
Borden	6,250	94	Use of the alignment may be possible, but would be constrained by habitat, easement width, and access issues. There is a feasible bypass route.	**Bypass**
Twin Oaks	4,975	94	Very difficult access and slope conditions with tight bends. Bypass is preferred.	**Bypass**
MW	2,115	9	No replacement or bypass needed. Bench was recently rehabbed with full structural solution.	**Use**
TOTALS	**30,270**			
-- Use	3,075		10 percent of total bench length	
-- Bypass	27,195		90 percent of total bench length	

* See **Figure 1** for bench section locations

5.4. Over the long-term, most of the siphon sections may need to be structurally relined or replaced. Internal inspections may be needed to refine this analysis.

Concerning the siphons, we are faced with considerable unknowns. For the 90 percent of the siphon footage that is steel, we know the mortar lining needs to be replaced, and we know that cathodic protection reports have indicated favorable protection status. However, most of the lines

have never been subject to internal inspection, and we do not know the thickness of steel remaining, nor whether it has suffered corrosion pitting or other deterioration. Absent this level of thorough condition assessment, we are led to a conservative assumption that most of these sections will require replacement or structural relining over the 50-year planning horizon of the study. A thorough condition assessment, consisting of internal inspection using an electro-magnetic measuring tool or similar non-destructive testing device, might produce results that supported a less conservative assessment, and hence a less costly estimate of Flume replacement.

Our preliminary assessment of each of the siphon sections is summarized in the table below.

Siphon Section Condition and Replacement Schedule Summary

Siphon	Length (ft.)	Age (yrs.)	Material	Condition Notes	Replace?
Pleasant Valley	2,085	94	Steel	Age indicates probable need for structural relining or replacement. Replacement could be accomplished as part of bypass of Tunnel and Daley benches.	**Yes**
Baum-gartner	3,340	2	HDPE	Section recently replaced in new alignment during development. No further improvements needed.	**No**
Rincon	4,465	17	Steel	Recently replaced section. Subject to condition assessment review, no further improvements needed.	**No**
	900	94	Steel	Age indicates probable need for structural relining or replacement.	**Yes**
Caldwell	555	10	PVC	PVC portion of this siphon recently replaced. No further improvements needed.	**No**
	840	47	Steel	Subject to condition assessment review, replacement or structural rehabilitation assumed to be needed in future, but not urgent.	**TBD**
Pearson	600	94	Concrete	Age indicates probable need for structural relining or replacement. Replacement could be accomplished in conjunction with bypass of MD and Pearson benches.	**Yes**
Jones	2,370	64 and 94	Steel	Age indicates probable need for structural relining or replacement. A 660-ft portion would be replaced as part of bypass of the MD and Pearson benches.	**Yes**
Beehive	770	30	Concrete	Previous studies indicate replacement would be needed to accommodate pressurization.	**Yes**
Twin Oaks	5,745	27 and 94	Steel	Age indicates probable need for structural relining or replacement for all but the newer sections. All but 1,720-ft of siphon, including the more recently replaced sections, would be replaced as part of the Twin Oaks bench bypass.	**Yes**
Meyers	1,285	94	Concrete	Age indicates probable need for structural relining or replacement. Replacement for an 880-ft portion would be accomplished as part of the bypass of the Twin Oaks bench.	**Yes**
TOTALS	**22,955**				
-- Replace	13,755			60 percent of total siphon length	
-- Keep	8,360			36 percent of total siphon length	
-- TBD	840			4 percent of total siphon length	

* See **Figure 1** for siphon section locations

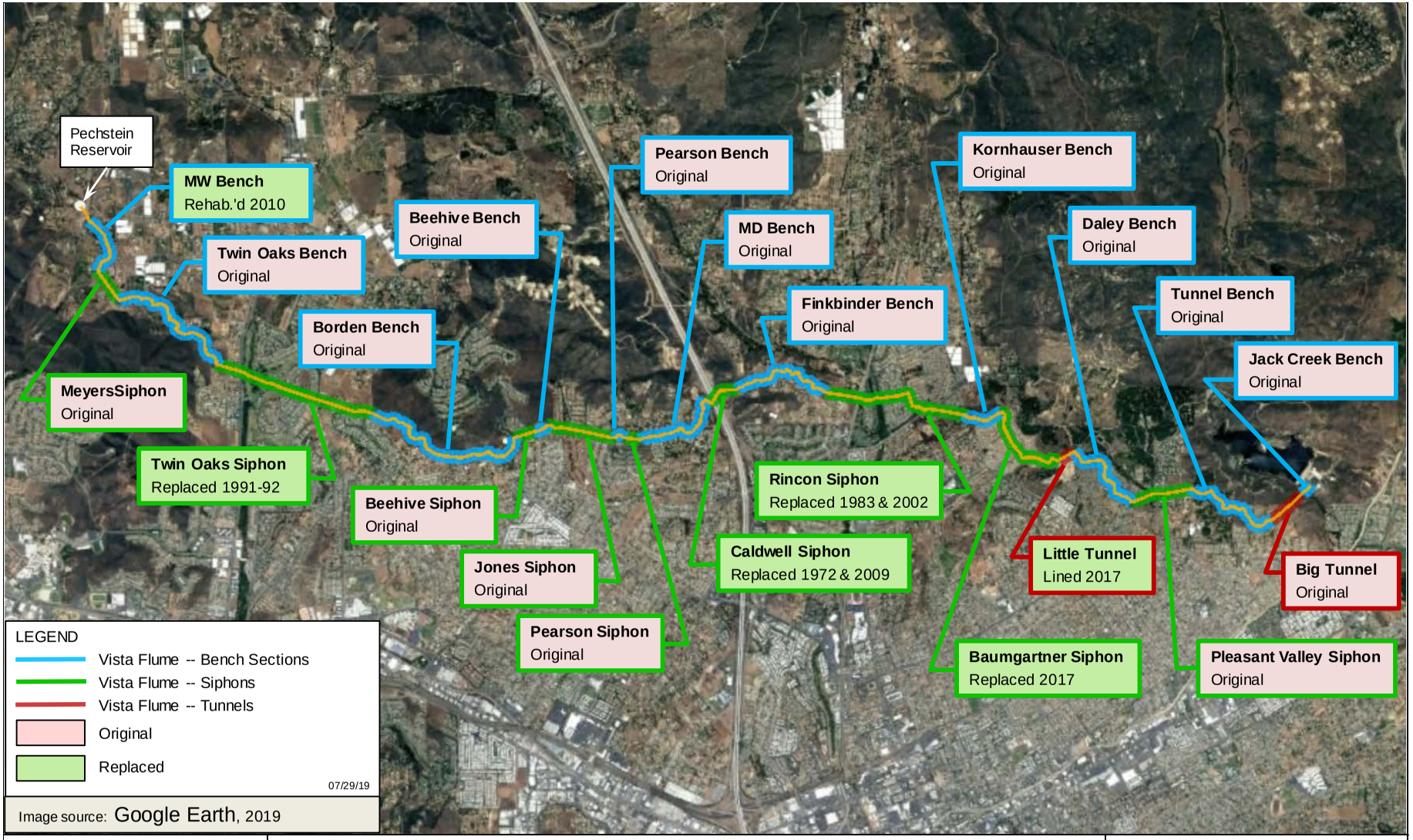
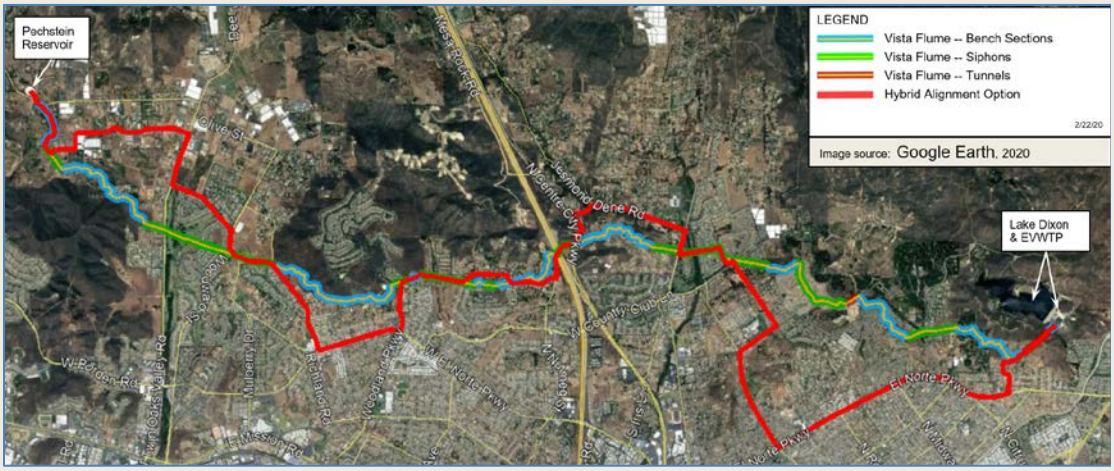


Figure 1	Water Supply Planning Study VISTA FLUME EXISTING BENCH, SIPHON, AND TUNNEL REACHES	VISTA IRRIGATION DISTRICT GILLINGHAM WATER Gillingham Water Planning and Engineering, Inc.

5.5. A Hybrid alignment is possible, but likely not preferred.

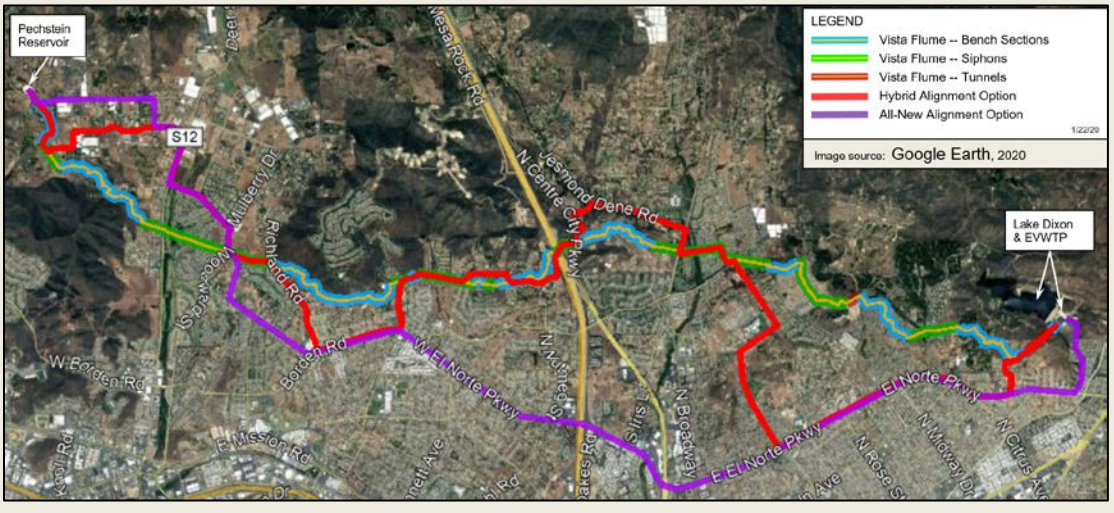
As reviewed above, project costs and other factors favor bypassing most reaches of the existing Flume alignment. Consequently, an alignment that sought to utilize as much of the existing Flume right-of-way and facilities as possible, which we dub a Hybrid alignment, would consist mostly of new bypass pipelines. A conceptual Hybrid alignment is illustrated in red in the figure below, and in **Figure 2** on the next page. All that zig-zagging around adds distance, and costs.



Hybrid Alignment Option. A conceptual Hybrid alignment (in red), mixing existing and new alignment reaches, appears the least-cost flume replacement alternative.

5.6. An All-New alignment appears economically preferred.

Although it may have seemed unlikely at the beginning of the Study, we now conclude that the most economical option for replacing the Flume will be an All-New alignment, consisting of pressurized pipeline in, or mostly in, public rights-of-way. A conceptual version of such an alignment is illustrated in purple in the figure below, and in **Figure 2** on the next page.



All-New Alignment Option. A conceptual All-New alignment (purple line) may be more expensive than a Hybrid alignment, but offers advantages that may warrant the additional cost.

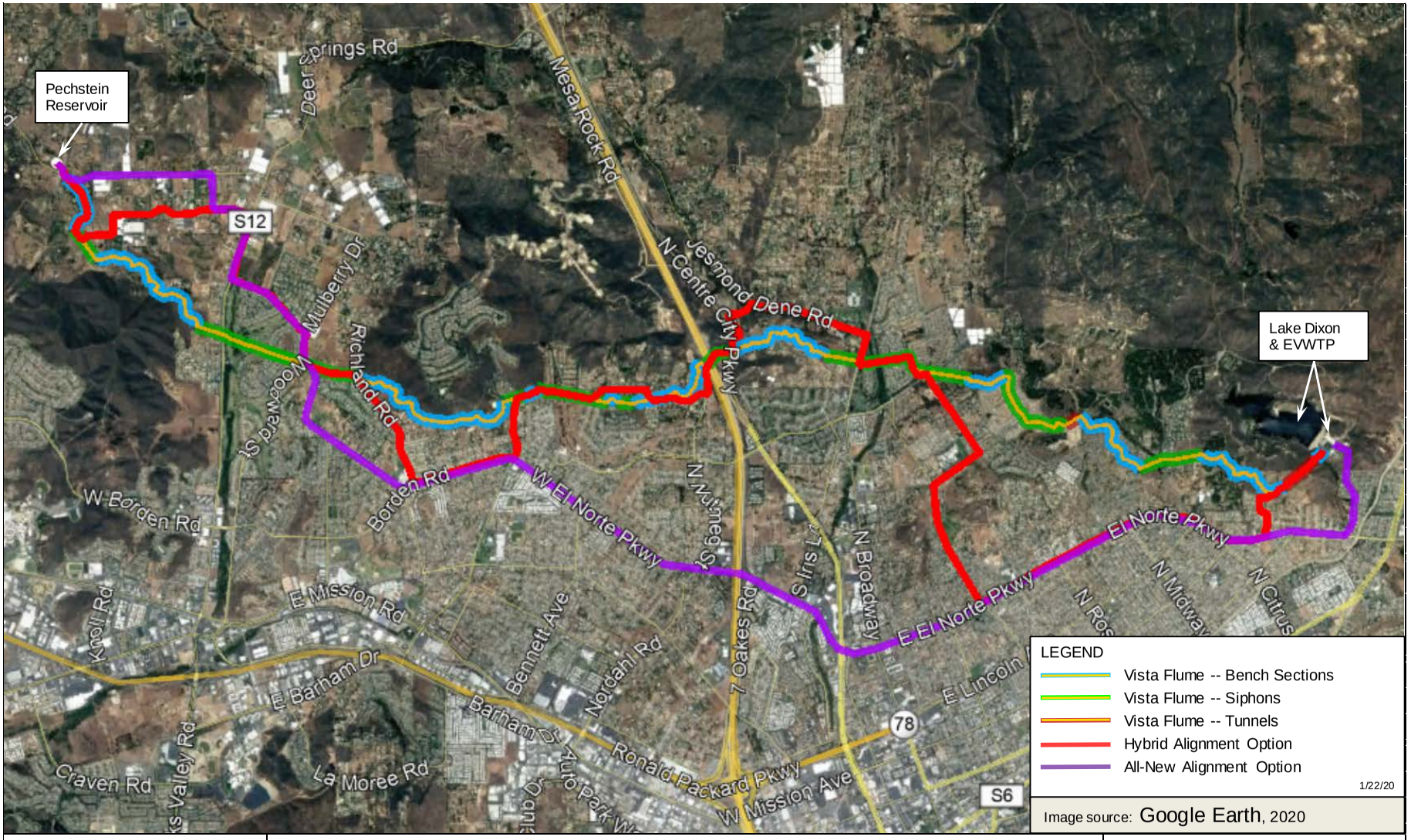


Figure 2	Water Supply Planning Study	VISTA IRRIGATION DISTRICT
	VISTA FLUME REPLACEMENT ALIGNMENT ALTERNATIVES	GILLINGHAM WATER Gillingham Water Planning and Engineering, Inc.

5.7. An All-New alignment also provides water quality and security advantages.

The operation of the existing bench sections of the Flume is unpressurized. Industry practice favors the use of pressurized facilities for conveyance of treated water, so as to minimize the potential for intrusion of contaminants. The study team believes pressurization is a preferred component of a Flume replacement project. This factor favors the All-New alignment with its capability to provide full pressurization. The Hybrid alignment allows for some improvement in pressurization relative to existing operations, but to a lesser degree than the All-New option.

The District mitigates for its current unpressurized operation through the use of on-line monitoring of disinfectant residual. Residual is monitored at the start, mid-point (VID1), and terminus of the Flume. In the event monitoring detected a loss of residual, system operators would halt flow in the Flume and if necessary isolate Pechstein reservoir. The District system was reviewed and approved for permit renewal by the California Division of Drinking Water (DDW) in 2017, with no additional conditions being applied to operation of the Flume.

In the event the District elects to proceed with the To Flume option, the Study team recommends it coordinate with DDW during the Alignment Study phase of work to address these issues and ease the way for ultimate DDW approval of the project.

5.8. Pipeline sizing will maintain existing capacity.

The District estimates the current capacity of the Flume to be 21.5 mgd. A Flume replacement pipeline sized at 36-inches internal diameter would maintain and slightly increase that capacity, providing for delivery of up to 25 mgd as indicated in the table below. A larger pipe would provide additional but seldom needed capacity, at additional costs that exceed the modest value of the additional capacity. A smaller pipe would reduce project costs, but would also constrain the ability of the District to deliver local water during wet years.

Flume capacities at alternative pipeline diameters are summarized in the table below. The All-New alignment is shorter in length than the Hybrid alignment and as a result provides for slightly greater capacity at the same pipe diameter.

Pipeline Sizing and Delivery Capacity

Pipeline Internal Diameter	Capacity [1]		Discussion
	Hybrid (71,100 ft.)	**All-New** (58,900 ft.)	
Small – 30 in.	14 mgd	15 mgd	Undersized relative to District demands and wet-year yield of local water system, but would reduce capital costs.
Mid-Range – 36-in.	22 mgd	24 mgd	Approximately matches existing Flume capacity of 21.5 mgd. Provides adequate capacity for serving all but peak District demands, and provides sufficient capacity to fully utilize wet-year yields of the local water system.
Large – 42-in.	33 mgd	36 mgd	Oversized capacity provides modest benefits of operational flexibility, but incurs additional capital costs.

1. Calculations based on Hazen-Williams "C" factor (pipeline roughness coefficient) = 130, and available pipeline headloss = 130 ft. (978.5 ft. @ EVWTP filter effluent weir, less 837 ft. Pechstein HWL, less 9.5 ft. minor losses and flow control = 132 ft.) The resulting energy slope = 1.86 ft./1,000 ft. for the Hybrid alignment, and 2.24 ft./1,000 ft. for the All-New alignment.

5.9. Planning-level total project costs are approximately $120 million. We have assumed the use of welded steel pipe.

The study team has engaged a group of professional cost estimators to generate preliminary opinions of probable construction and total project costs for both the All-New and Hybrid alignment alternatives. Our work has included analysis of recent San Diego area construction bid data for similar pipeline projects built under similar conditions. The bid data reflects real-world conditions and are inclusive of all construction contingencies including miscellaneous appurtenances, utility relocations, traffic control, trenching, and other conditions that would be expected to be encountered on a Flume replacement project.

Our preliminary estimate of project costs for the All-New alignment alternative is summarized in the table below.

Preliminary Concept-Level Capital Cost Estimates – All-New Alignment

Item	Unit	Quantity	Unit Cost	Cost[1]
Pipeline				
Major Arterial	$/in./ft.	36 in. 17,500 ft.	$36.00	$22,680,000
Minor Arterial	$/in./ft.	36 in. 24,800 ft.	$25.00	$22,320,000
Collector	$/in./ft.	36 in. 13,100 ft.	$22.00	$10,380,000
Open Space	$/in./ft.	36 in. 3,500 ft.	$25.00	$3,150,000
		58,900 ft.	*$27.60*	*$58,530,000*
EVWTP Connection	LS	1	$2,000,000	$2,000,000
I-15 Crossing Surcharge	$/ft.	1000	$1,500	$1,500,000
Jack and Bore Surcharge	$/ft.	1000	$1,000	$1,000,000
Boot & Bennett Connections	LS	2	$750,000	$1,500,000
Isolation Valves	LS	2	$250,000	$500,000
Flow Control Facility / Pechstein Connection	LS	1	$2,000,000	$2,000,000
Instrumentation	LS	1	$1,000,000	$1,000,000
Easements / Land Acquisition	$/acre	0.0	$500,000	$0
Subtotal Pipeline				$68,000,000
Flume Demolition				
Bench Sections	$/ft.	30,270	$150	$4,540,000
Siphon Sections	$/ft.	22,995	$150	$3,450,000
Tunnel Sections	$/ft.	2,010	$150	$300,000
Subtotal Flume Demolition		*55,275*		*$8,300,000*
Mark-ups and Other Costs				
Subtotal				*$76,300,000*
Contingency	%		25%	$19,100,000
Subtotal Construction Cost				*$95,400,000*
Design / Administration / Environmental / Permitting	%		23%	$21,900,000
TOTAL PROJECT COST				**$117,300,000**
TOTAL PROJECT COST (rounded)				**$120,000,000**

1. Costs in 2020 dollars. (January 2020 ENR LA CCI = 12,144)

In comparison, we estimate the cost of the Hybrid alternative to be approximately $10 million higher, for a total cost of approximately $130 million. The higher cost of the Hybrid alternative, at the conceptual level of cost review, arises primarily due to its longer length. The cost includes approximately $2 million to account for the probability-weighted cost of lost local water deliveries and local treatment benefits during extended Flume shutdowns.

Our cost estimates are for welded steel pipe. The Study team has evaluated the possible use of alternative pipe materials, including PVC and Ductile Iron, and determined that at the assumed diameter of 36-inches, and for construction in urban arterial roads, these materials are unlikely to achieve significant cost savings, while lacking the long-term durability and resiliency of welded steel. Alternative pipe materials should be further considered during the preliminary and final design phases of the project, but for the current purposes of project planning we recommend the estimates of project costs assume the use of welded steel.

The estimates reflect the current San Diego area bidding climate, which is high in comparison to historical conditions. Assuming a Flume project were bid a few years in the future, the bidding climate in effect at that time will influence the project costs.

The estimates are preliminary, based not on detailed construction drawings but rather on professional judgement of the construction conditions and methods likely to be applicable to each reach of the alignment as depicted in **Figure 1**. The estimates are Class 5 planning level estimates; we estimate their accuracy range at approximately -35 to +50 percent.

5.10. A final determination of alignment, pipe material, pipeline diameter, and other factors would be made as part of Alignment and Preliminary Design studies.

The Study's review of Flume replacement options, including alignments, pipe materials, pipeline diameters, and other factors has advanced only to a degree sufficient to confirm overall feasibility and to generate a range of probable costs. Our alignment options in particular are conceptual only, and are not intended to imply preference for routing decisions. Those decisions are in the future. Should the District elect to proceed with the To Flume option, it would undertake Alignment Study and Environmental Documentation efforts that would evaluate multiple alternatives and identify, and document, preferred project solutions.

Those future studies would also give further consideration to the following issues relative to differences between Hybrid and All-New alignments:

- **Right-of-Way Issues:** The District's easement holdings for the existing Flume pre-date almost every other utility in the area, meaning any relocation of Flume facilities required by others is paid for by others. This factor advantages the Hybrid alignment over the All-New alternative. At the same time, the existing Flume easements require ongoing maintenance and inspection, adding operating costs. This factor advantages the All-New alignment.
- **Capital Outlay Programming:** The Hybrid alignment option allows for phased construction, spreading out capital outlay spending over a longer time. In particular, future condition assessment work on the siphon sections may support deferring structural relining of those reaches for additional decades. In comparison, the All-New alignment option could at most be broken into two reaches (in **Figure 1**, these are delineated by the point where the purple All-New line crosses the Flume), and these phased a few years apart, with only modest attenuation of capital outlay spending levels.

6. Conclusions and Next Steps

6.1. First-Year Cost Review: Modest favor the To Flume option.

First-year unit costs of the Not To Flume and To Flume options are summarized in the tables below. The comparison does not account for differences in cost escalation over time.

First-Year Costs for Not To Flume Option

Cost Component	Description	Equivalent Unit Cost[1]
Increased Water Authority Purchases	Purchase an additional 5,000 AF/yr, on average, of treated Water Authority water at a first year "all-in" rate of $1,700, as presented in **Section 1.5.**	$1,700/AF
Local System O&M	Operate and maintain the local water system on a long-term, asset management driven basis as described in **Section 2.**	$720/AF
Exchange Benefit	Sale of local water to Escondido, per **Section 3.** The benefit is expressed on the basis of 5,000 AF/yr of local system yield.	($420/AF) (benefit)
Delivery Reliability Mitigation	To compensate for reduction in delivery reliability absent the Flume, increase storage of planned Pechstein II reservoir by 10 MG, at a capital cost of $15M[2], as described in **Section 4.1.**	$140/AF
Boot and Bennett Transfer	Transfer Boot and Bennett areas to Vallecitos, incurring a mid-range capital cost of $17M[2] as presented in **Section 4.2.**	$160/AF
Reduced Pumping Costs	By taking water at its VID3 connection rather than from the Flume, the District achieves annual pumping cost savings of $210,000 and capital cost savings of $5M[2], as presented in **Section 4.3.**	($90/AF) (benefit)
TOTALS	(Rounded)	**$2,200/AF**

First-Year Costs for To Flume Option

Cost Component	Description	Equivalent Unit Cost[1]
Local Water System O&M	Operate and maintain the local water system on a long-term, asset management driven basis as described in **Section 2.**	$720/AF
Water Treatment	Treatment of local water at the EVWTP, as described in **Section 2.**	$200/AF
Flume Replacement	Replace the Flume at a total capital cost of $120M[2] as described in **Section 5.**	$1,150/AF
Flume O&M	Operate and maintain the Flume, per **Section 5.** (Asset management costs do not begin until after the 30 year finance period.)	$20/AF
Self-Treatment Benefit	Operation of the Flume allows the District to use approximately 7,500 AF/yr of Water Authority raw water, which it treats at a cost approximately $75/AF less than the Water Authority treated water rate differential. The equivalent unit benefit is expressed on the basis of 5,000 AF/yr of local system yield.	($110/AF) (benefit)
TOTALS	(Rounded)	**$2,000/AF**

1) Equivalent unit costs in 2020 dollars, for 5,000 AF/yr average annual yield of the local water system.

2) Capital costs are amortized at 2.5 percent over 30 years (A/P = .0478), and converted to unit cost using the District's 5,000 AF/yr average annual yield of the local water system.

6.2. 30-Year Cost Review: Differences in cost escalation rates result in pronounced advantage to the To Flume option.

The first-year costs presented in **Section 6.1** do not account for differences in the rates of cost escalation between the options over time. We expect most of the cost components listed will inflate over time at the assumed mid-range rate of 3.0 percent per year, as described in **Section 1.7**. We expect however that the two largest cost line items, Water Authority treated water rates and Flume Replacement amortized costs, will escalate at rates different than inflation with significant consequences to the overall cost comparison.

Regarding Water Authority treated water rates, the best available forecast as described in **Section 1.5** indicates rates are likely to increase faster than inflation for approximately the next 10 years, and thereafter equal to inflation. In contrast, Flume Replacement amortized costs, assuming the use of conventional level 30-year financing, would remain steady over the period with no escalation. This combination of escalating Water Authority rates and steady Flume Replacement amortization costs weighs to the significant advantage of the To Flume option.

The resulting thirty-year costs are summarized in the tables below.

Thirty-Year Present-Worth Costs[1] for Not To Flume Option

Cost Component	Annual Cost Escalation	30-Year Costs[2]
Increased Water Authority Purchases	Years 1-10: Mid-Range Inflation + 1.5% Years 11-30: Mid-Range Inflation	$287M
Local System O&M	Mid-Range Inflation	$108M
Exchange Benefit	Mid-Range Inflation	($63M)
Delivery Reliability Mitigation	None	15M
Boot and Bennett Transfer	None	17M
Reduced Pumping Costs	O&M Portion: Mid-Range Inflation Capital Portion: Zero (level financing)	($11M)
TOTALS	(Rounded)	**$350M**

Thirty-Year Present-Worth Costs[1] for To Flume Option

Cost Component	Annual Cost Escalation	30-Year Costs[2]
Local Water System O&M	Mid-Range Inflation	$108M
Water Treatment	Mid-Range Inflation	$30M
Flume Replacement	None	$113M[3]
Flume O&M	Mid-Range Inflation	$3M
Self-Treatment Benefit	Mid-Range Inflation	($17M)
TOTALS	(Rounded)	**$240M**

1. All annual cost items are inflated as noted over 30 years, then brought back to present worth at a discount rate of 3.0%/yr.
2. Costs in 2020 dollars
3. That's not a typo. The assumption that the project will receive low-interest financing results in an effective subsidy in its present-worth cost. The subsidy for $120M of capital financed at 2.5% interest over a 30- year period, and brought back to present worth at a discount rate of 3.0%, amounts to approximately $7M.

Beyond the 30-year finance period, all of the costs for the Not To Flume option continue to accrue, while costs for the To Flume option decrease with the retirement of the capital debt. At that time the District would begin accruing a sinking fund for long-term maintenance and repair of the new Flume, but the annual cost for this fund would be considerably less than the bond payment amount. **This suggests the long-term cost advantages of the To Flume option would likely continue beyond the 30-year finance period and into the future.**

6.3. Sensitivity Analysis: The cost comparison can be altered by changes to individual assumptions; however, getting the scale to tip the other way requires changes to multiple assumptions.

The cost comparisons presented in **Sections 6.1** and **6.2** utilize the Mid-Range estimates for all cost components and financing terms. The Mid-Range assumptions reflect the Study team's best estimates and professional judgements; we think those are the best numbers to use for the current planning purposes. Nevertheless, we recognize that our estimates and assumptions about future conditions are imperfect, and that actual costs and actual future conditions could vary. Having demonstrated that the cost balance scale tips in favor of the To Flume option using the Mid-Range estimates, it is prudent to consider the sensitivity of that outcome to changes in the assumptions.

The Sensitivity Analysis table on the next page summarizes the effects on the thirty-year cost comparison of making one-at-a-time changes to key individual assumptions. For example, what is the effect on the cost comparison of changing the project interest rate from the Mid-Range value to a higher rate, or what is the effect of assuming Water Authority rates will escalate at a pace lower than the Mid-Range assumption? For comparison, the first row of the table lists what we have labeled as the Baseline Condition, the costs that result from consistent application of the Mid-Range assumptions as detailed in the previous subsection.

Because the cost balance scale for the Baseline Condition tilts so prominently in favor of the To Flume option, the Sensitivity Analysis table presents only changes made in the direction of advantaging the Not To Flume option at the expense of the To Flume option (e.g., adjusting project interest rates to make financing of a Flume Replacement project more expensive than for the Mid-Range condition). It is important to keep in mind that for every changed assumption presented in the direction of advantaging the Not To Flume option, there is an equal and opposite change that would further advantage the To Flume option (e.g., we could change the interest rate assumption the other direction to make the financing of a Flume Replacement project less expensive than the Mid-Range condition).

Sensitivity Analysis for Changes to Individual Cost Variables

(With all adjustments made in the direction of advantaging the Not To Flume option)

Cost Variable	Assumption	Effect	30-Yr. Costs[1]	
			Not To Flume	To Flume
Baseline Condition	Baseline costs using all Mid-Range assumptions, per **Section 6.2**.		**$350M**	**$240M**
1. Interest Rates	Increase project interest rate from the Mid-Range value of 2.5% (melded) to Pessimistic range value of 4.0%	Increases present-worth cost of Flume replacement by ~$22M	$350M	⇧ $260M (+$20M)
2. Rate Escalation	Reduce the pace of rate escalation from Mid-Range (inflation + 1.5% next 10 years, thereafter at inflation), to Optimistic (inflation + 1% for next 5 years, thereafter at inflation)	Reduces cost of Water Authority purchases for local yield replacement water by ~$20M	⇩ $330M (-$20M)	$240M
3. Exchange Opportunities	Increase the exchange revenue from Mid-Range ($420/AF) to Optimistic ($530/AF)	Reduces net cost of Not To Flume option by ~$20M	⇩ $330M (-$20M)	$240M
4. System Improvements	Change Boot and Bennet transfer cost from Mid-Range ($17M) to Optimistic ($6M)	Reduces cost of Not To Flume option by ~$10M (rounded)	⇩ $340M (-$10M)	$240M
5. Flume Replacement	Assume replacement costs 25% above budget	Increases costs of Flume replacement by ~$30M	$350M	⇧ $270M (+$30M)
6. Average Local Yield	Reduce the average yield of the local water system from Mid-Range (5,000 AF/yr) to Pessimistic (4,000 AF/yr) (Note: Less yield would mean less replacement water would be required.)	Reduces cost of Water Authority purchases for local yield replacement water by ~$60M Reduces costs for local water treatment by ~$10M	⇩ $290M (-$60M)	⇩ $230M (-$10M)

1. Costs in 2020 dollars

It is apparent from the table that the long-term cost advantages of the To Flume option are robust, in that changes to individual assumptions alone are not sufficient to tip the balance scale the other way. Of the six variables presented, changes to the last, Average Local Yield, result in the largest swing in costs ($50M net) between the To Flume and Not To Flume options.

To further test sensitivity, the table on the next page presents the results of applying multiple changed assumptions simultaneously, all in the direction of advantaging the Not To Flume option.

Sensitivity Analysis for Changes to Multiple Cost Variables, Case 1

(With all adjustments made in the direction of advantaging the Not To Flume option)

Cost Variable	Assumption	30-Yr. Costs[1]	
		Not To Flume	To Flume
Baseline Condition	Baseline costs using all Mid-Range assumptions, per **Section 6.2**.	**$350M**	**$240M**
First Five of Six (1. Interest Rates, 2. Rate Escalation, 3. Exchange Opportunities, 4. System Improvements, 5. Flume Replacement)	Assumes the first five of the assumptions change, in unison, from their Mid-Range values to those most favorable to the Not To Flume option.	⇩ $300M (-$50M)	⇧ $290M (+$50M)
All Six (The first five above, plus: 6. Average Local Yield)	Assumes all six of the assumptions change in unison from their Mid-Range values to those most favorable to the Not To Flume option.	⇩ $240M (-$110M)	⇧ $280M (+$40M)

The table demonstrates that with enough changes to the Mid-Range assumptions, all made in the direction of favoring the Not To Flume option, it is possible to bring the long-term costs of the two options to parity, and in the extreme to gain modest comparative cost advantage (on the order of $1.5 million per year over thirty years) for the Not To Flume option. **We consider this scenario unlikely, but do not deny it is possible.**

On the topic of what is possible, remember the above sensitivity analysis tables are intentionally biased in favor of lending advantage to the Not To Flume option. If we instead adjusted the sensitivity variables in the other direction, in favor of the To Flume alternative, the cumulative results would be as presented in the table below.

Sensitivity Analysis for Changes to Multiple Cost Variables, Case 2

(With all adjustments made in the direction of advantaging the To Flume option)

Cost Variable	Assumption	30-Yr. Costs[1]	
		Not To Flume	To Flume
Baseline Condition	Baseline costs using all Mid-Range assumptions, per **Section 6.2**.	**$350M**	**$240M**
First Five of Six (1. Interest Rates, 2. Rate Escalation, 3. Exchange Opportunities, 4. System Improvements, 5. Flume Replacement	Assumes the first five of the assumptions change in unison from their Mid-Range values to those most favorable to the To Flume option.	⇧ $400M (+$50M)	⇩ $205M (-$35M)
All Six (The first five above, plus: 6. Average Local Yield)	Assumes all six of the assumptions change in unison to those most favorable to the To Flume option.	⇧ $485M (+$135M)	⇩ $215M (-$25M)

The table above and the one prior demonstrate the swing between wildly pessimistic and wildly optimistic assumptions. We think the actual numbers are most likely to be closer to the middle of this range.

6.4. Review of Non-Cost Factors: Both options have comparative advantages and disadvantages. We think To Flume comes out ahead, but the evaluations here are subjective. Your call.

Major non-cost attributes of the Not To Flume option are summarized in the table below. The evaluations presented here are preliminary and subject to Board refinement.

Major Non-Cost Components for Not To Flume Option

Evaluation Factor	Discussion	Rating	
		To Flume	Not To Flume
Maximize Service Reliability and Operational Effectiveness	Without the Flume, the District would incur loss of an increment of delivery reliability provided by the Flume. Delivery reliability in the Not To Flume option is mostly compensated for as described in **Section 4.1**, but not entirely.	↑	→
Minimize Environmental Impacts / Protect Environmental Resources	Potential adverse environmental effects of a Flume replacement project appear mitigable, with costs included in the estimate. Environmental management of the Warner Basin could continue under either option.	→	→
Implementability – Capital Outlay Expenditures	Even though equivalent unit costs are level between the options, the To Flume option requires large capital financing, while the Not To Flume option does not.	↓	↑
Implementability – Other Risks and Opportunities	Each option leads to its own set of risks and opportunities. The To Flume option incurs risk of hydrologic uncertainty as to future yield, but that uncertainty is as likely to be favorable and unfavorable. The To Flume option leaves open the potential opportunity of an expanded Warner Basin wellfield, but that opportunity has not yet been evaluated for economic merit.	↑	→
Regional Cooperation	The existing Flume provides valuable supply redundancy to the Rincon del Diablo, via an intertie utilized by Rincon del Diablo during Water Authority aqueduct shutdowns. Rincon del Diablo is hoping the District chooses To Flume.	↑	↓
Intrinsic Values	For board discussion	?	?

6.5. Course Corrections and Offramps: For either option, the District will have a period of further planning and design prior to going all-in. You will have opportunities for course corrections and offramps along the way.

The Water Supply Planning Study is not the final word on To Flume or Not To Flume. Rather, the results of the Study will inform the District's decision as to whether to proceed with the next steps for preliminary design and environmental documentation for one option or the other. Either path provides ample time and opportunity for further review and refinement of the findings of the work presented here, and we recommend that periodic overview assessments be built into the scope of work for either path.

If for example you elect to proceed with planning for a Flume Replacement Project, and if in the course of that planning you determined that all six of the cost variables from the prior table had shifted in favor of the Not To Flume option, you could change course at that time. We hope that takes a bit of the pressure off the current To Flume or Not To Flume decision.

6.6. Next Steps: To Flume

If the District chooses To Flume, its next steps will include the major items summarized in the table below.

Next Steps – To Flume Option

Action	Description	Schedule and Budget
1. Alignment Study	Conduct a thorough Alignment Study for a Flume Replacement Project. Evaluate alternative alignments, define key design parameters, refine project costs, and provide engineering support to the Environmental Documentation process	18-24 months $0.75M - $1.25M
2. Environmental Documentation	Conduct environmental documentation and preparation for project permitting	18-24 months $0.75M - $1.25M
3. Financial Planning	Develop project financing plans; prepare and apply for grants (depending on project eligibility) and low-interest loans	12-18 months $0.1M - $0.25M
4. Miscellaneous	• Average Local Yield: Refine estimates	12-18 months $0.1M - $0.25M
Total		24-36 months $1.7M - $3M

6.7. Next Steps: Not To Flume

If the District chooses Not To Flume, its next steps will include the major items summarized in the table below.

Next Steps – Not To Flume Option

Action	Description	Schedule and Budget
1. Flume Retirement Planning	Define timing and process for Flume retirement and demolition, including environmental review	12-24 months $0.5M - $0.75M
2. Boot and Bennett Transition	Prepare necessary agreements and studies with Vallecitos and LAFCO for transition of the Boot and Bennett areas to the Vallecitos service area.	12-24 months $0.25M - $0.75M
3. Delivery Reliability / Pechstein II	• Prepare formal plan for delivery reliability upon retirement of the Flume • Prepare preliminary design and environmental documentation for Pechstein II • Coordinate with the Water Authority to monitor implementation of their Isolation Valves project	12-24 months $0.25M - $0.75M
4. Escondido Water Purchase Agreement	• Coordinate with Escondido to formalize terms • Work with Escondido to explore opportunities for water quality and treatability improvements at Lake Wohlford and the EVWTP	12-24 months $0.25M - $0.5M
Total		12-24 months $1.25M - $3M

6.8. We'll see you at Workshop No. 3.

These are challenging and exciting issues for the District. We look forward to reviewing them with you at Workshop No. 3.

Exhibit A

VISTA IRRIGATION DISTRICT

Water Supply Planning Study
Workshop No. 3 – Fine Screening

March 11, 2020

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

Brown AND Caldwell

Ken Weinberg Water Resources Consulting

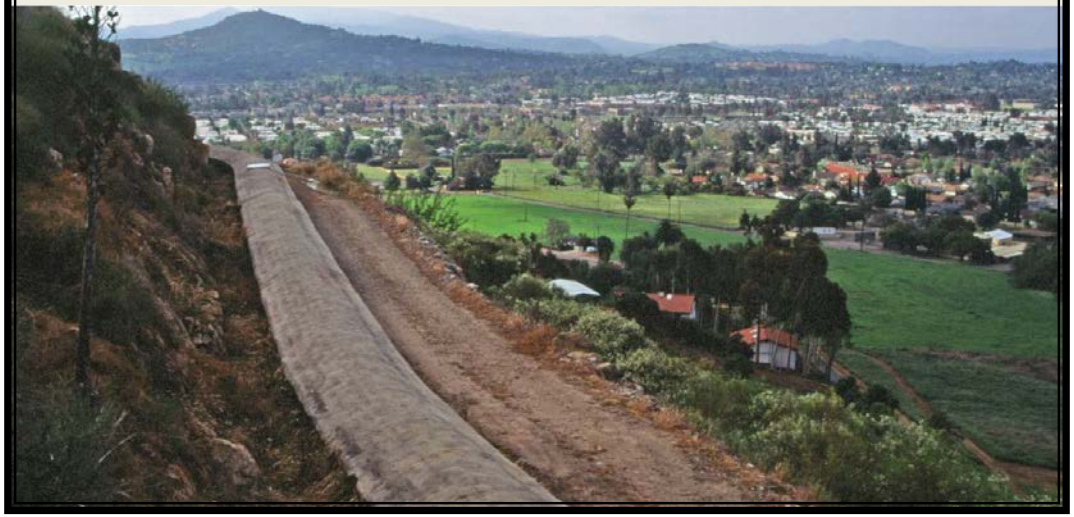
DLM ENGINEERING, INC

Richard Haberman, P.E.
Consulting Engineer

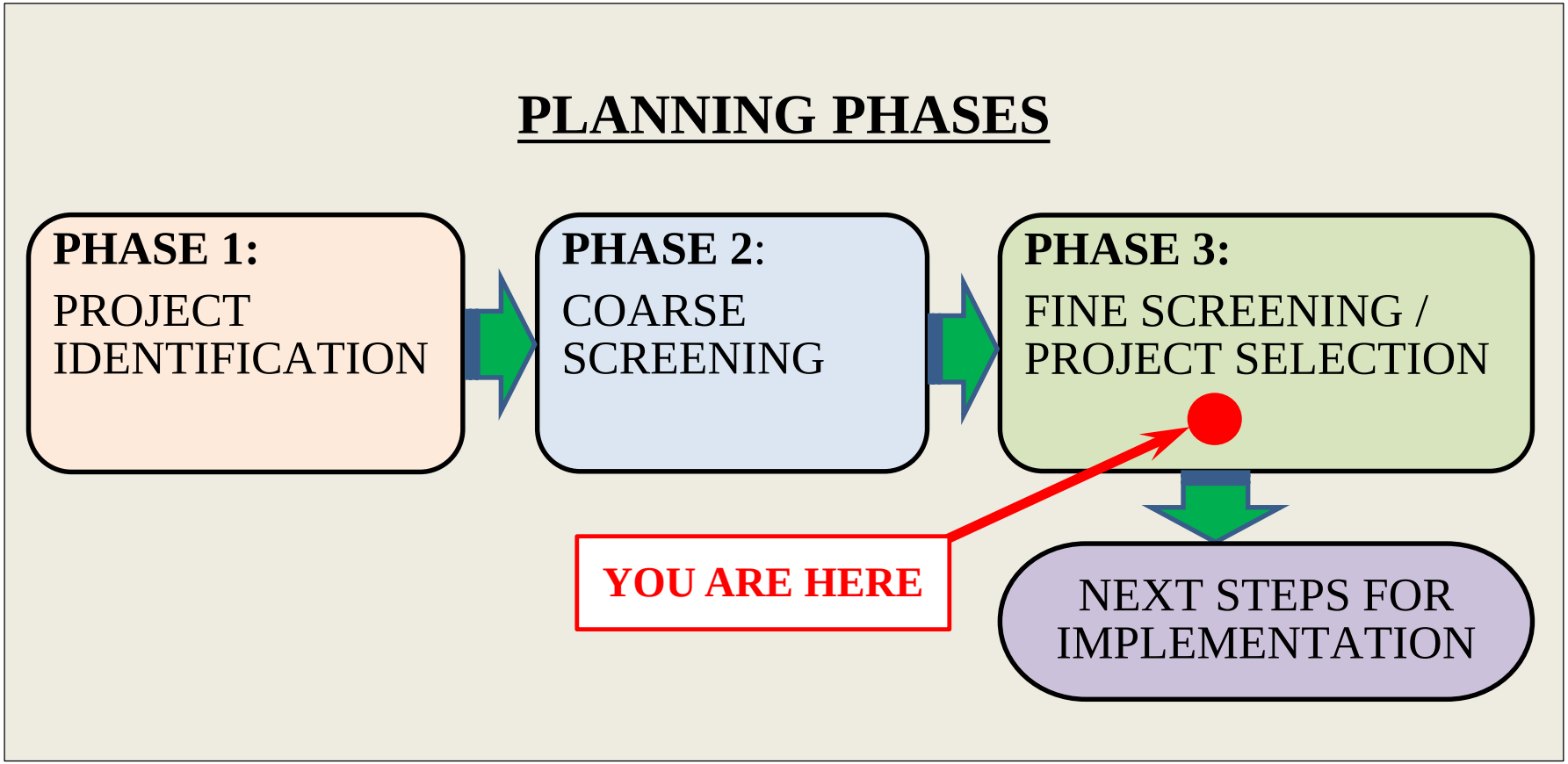
HDR

THE VISTA FLUME

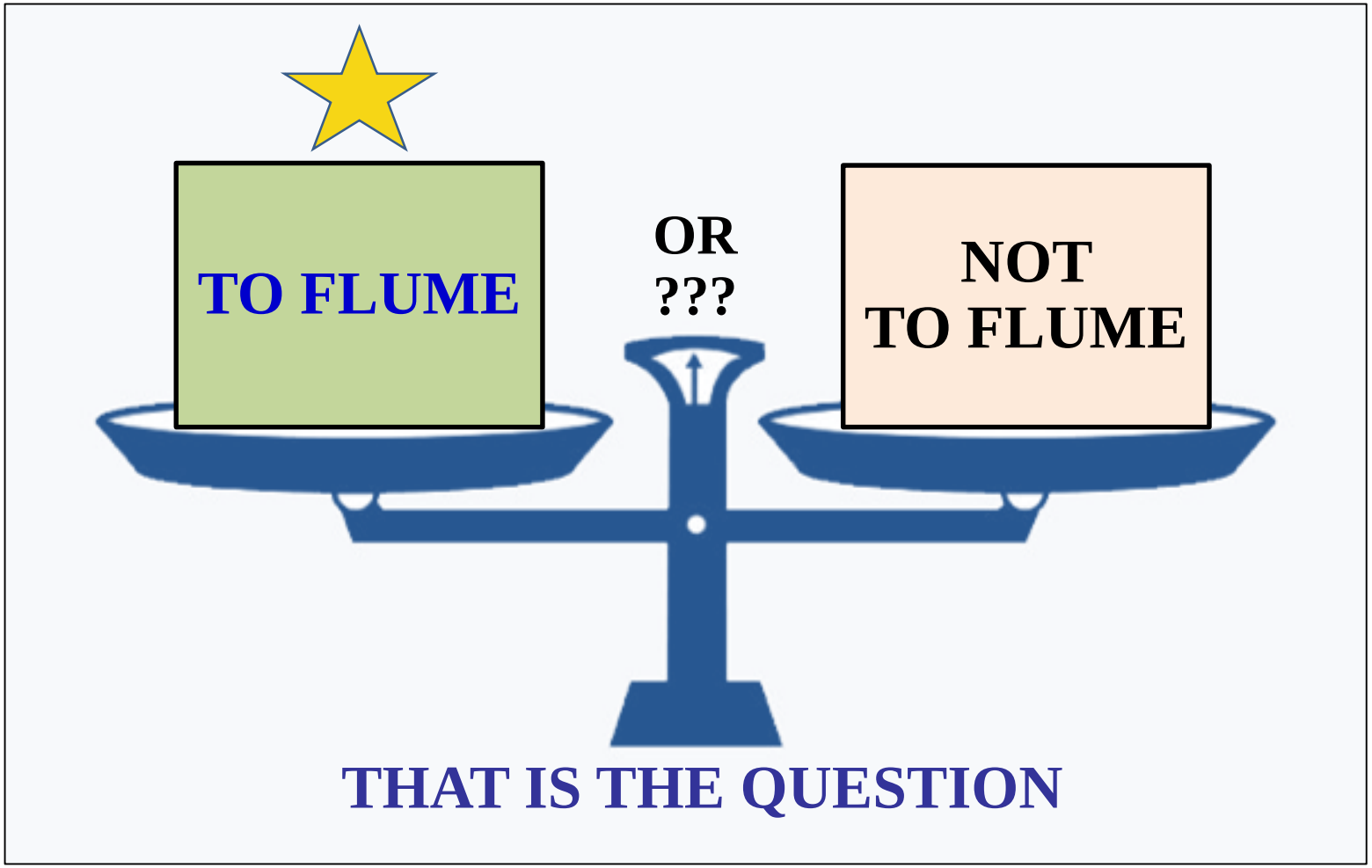
PROVIDING RELIABLE WATER SERVICE SINCE 1926



Study Process: Three Phases

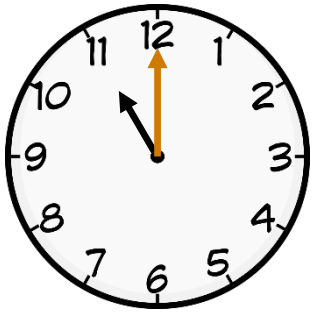


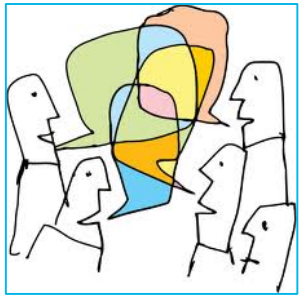
At the fine-screening level of review, the balance scale favors To Flume



AGENDA

1) INTRODUCTION
2) FINDINGS
3) CONCLUSIONS AND SENSITIVITY ANALYSIS
4) NEXT STEPS FOR PROJECT IMPLEMENTATION
5) ADJOURNMENT





FINE SCREENING FINDINGS

BOX 1

Flume Rehab Options

BOX 2

System Improvements (w/o Flume)

BOX 3

Raw Water Supply/ Treatment (w/ and w/o Flume)

BOX 4

Local Water Exchange Options (w/o Flume)

Box 3:
Local Water System and Treatment



Don MacFarlane, P.E. – DLM Engineering

Local Water System Costs: What Are the Long-Term Costs to Operate, Maintain, Repair and Replace the Local System?

Fine-Screening Refinements:

1. **Asset Management Budgeting:** Worked with national expert to refine and confirm approach

2. **Henshaw Dam:** Worked with national expert to refine long-term costs

3. **Escondido Canal:** Reviewed and confirmed "Continuous Repair" budgeting approach

Local Water System Costs: Annual Costs

Annual Operation, Maintenance, Repair, and Replacement Costs

Scenario	Well + Ditches	Henshaw Dam	Escondido Canal (EC)	S.P. Under-grounding[1]	Bear Valley	Other Budget[2]	Total
2019 Budget	$554,000	$214,000	$375,000	$20,000	Included with EC	$459,000	**$1.6M**
A) Low[3]	$795,000	$374,000	$435,000	$956,000	$342,000	$459,000	**$3.4M**
B) Middle[3]	$834,000	$484,000	$455,000	$956,000	$399,000	$459,000	**$3.6M**
C) High[3]	$891,000	$794,000	$477,000	$956,000	$479,000	$459,000	**$4.1M**

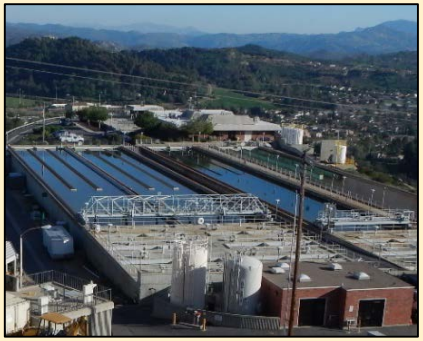
Increased investment will be needed for long-term sustainability

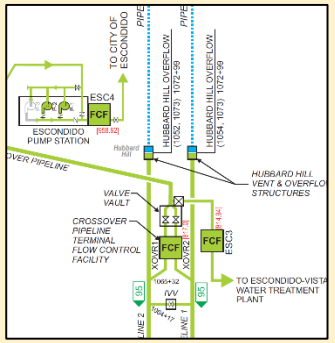
Local Water System Costs: First-Year Unit Costs

Annual Cost Per Acre-Foot of Water Produced

Scenario	Total Annual Cost	Average Yield (AF/yr)	Unit Cost Before Treatment	Average Treatment Cost	Unit Cost With Treatment
2019 Budget	$1,622,000	5,000	$325	$200/AF	**$535/AF**
A) Low	$3,361,000	5,000	$670	$200/AF	**$870/AF**
B) Middle	$3,587,000	5,000	$720	$200/AF	**$920/AF**
C) High	$4,056,000	5,000	$810	$250/AF	**$1,060/AF**

Box 4:
Local Water Transfer Options



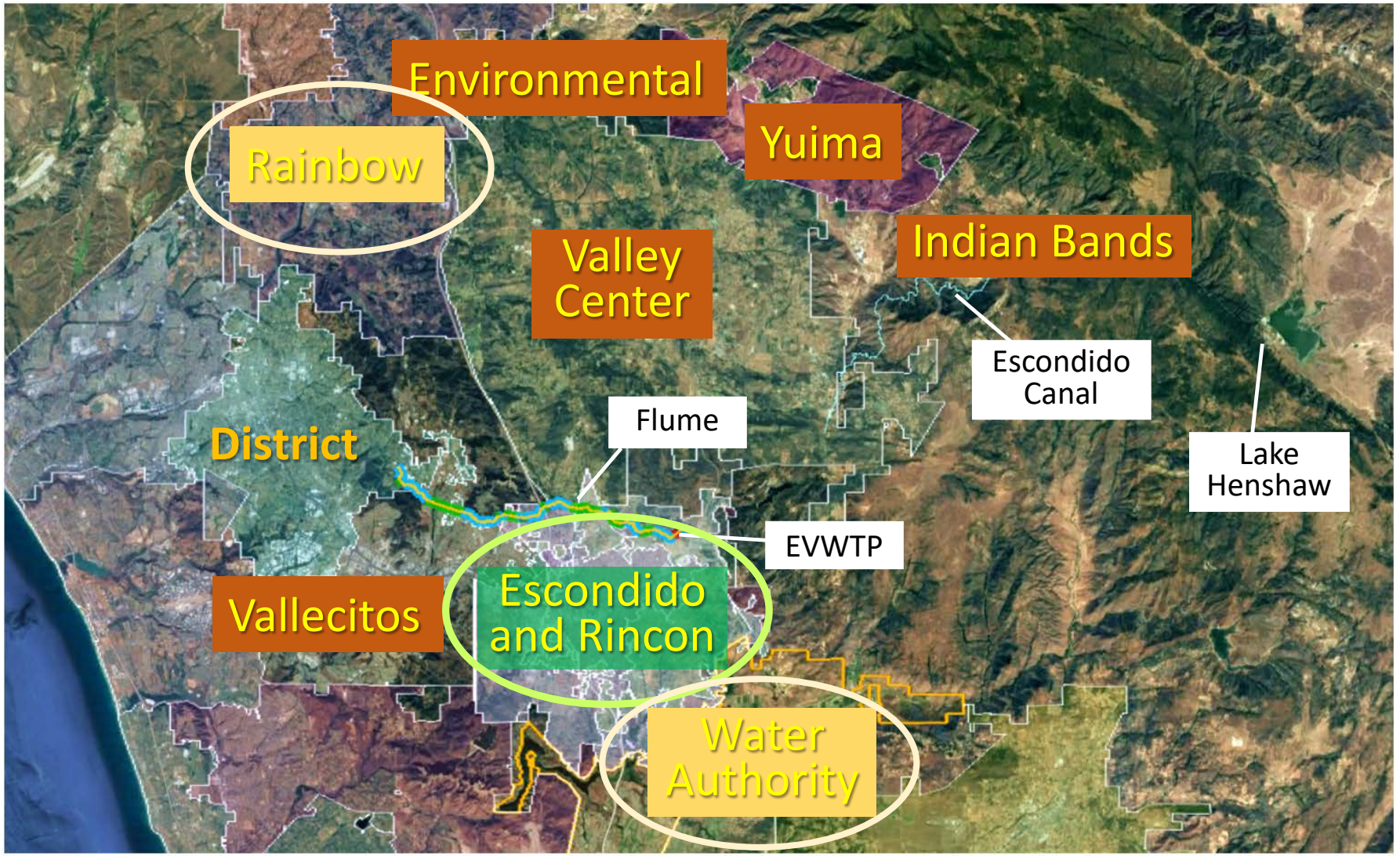


Ken Weinberg – Weinberg Water Resources

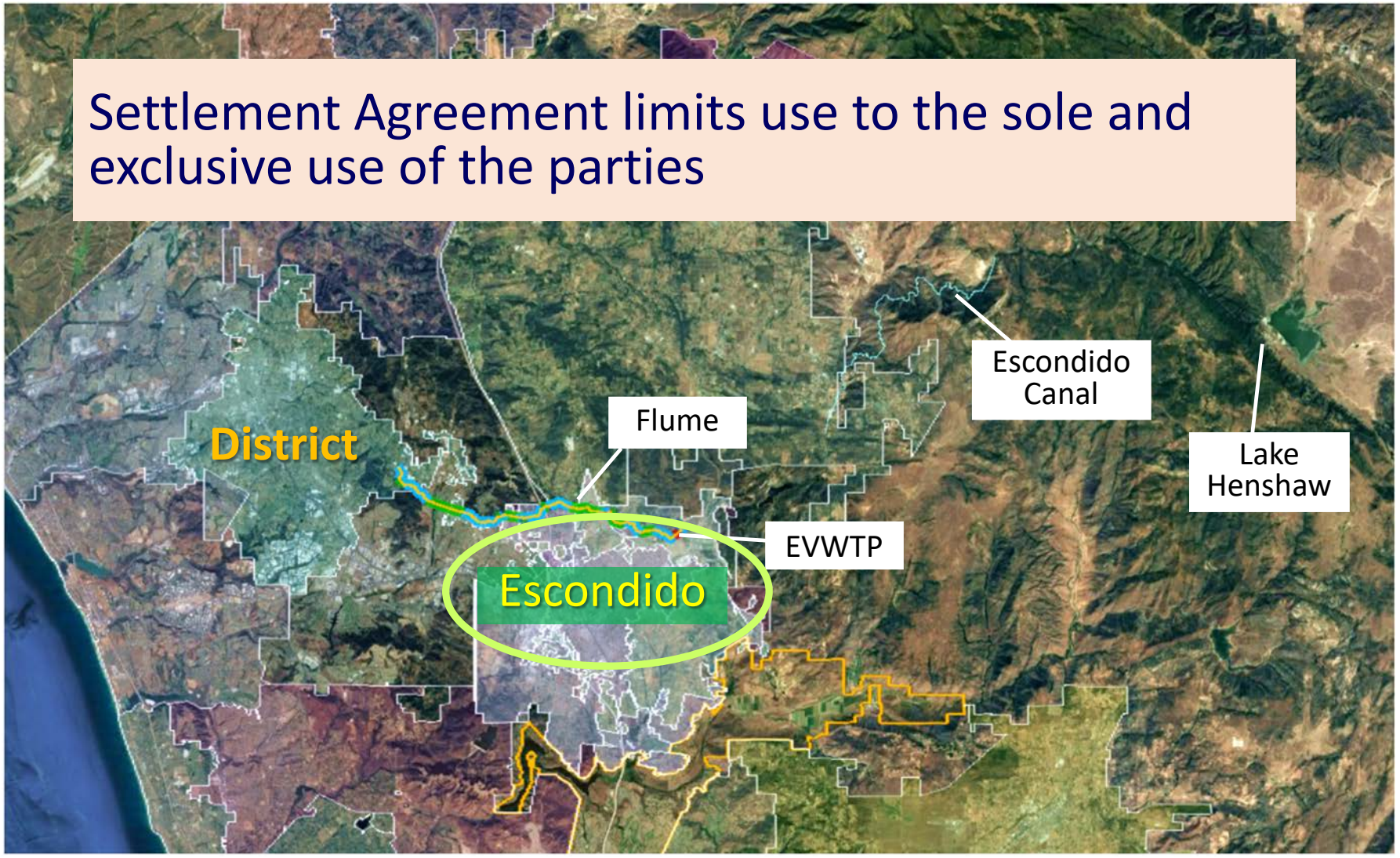
- Obtains $ to help offset increased Water Authority purchases

- Saves $ in comparison to Water Authority rates

Possible Exchange Partners: Previous Round



Possible Exchange Partners: Current: Escondido it is



Evaluating Escondido Exchange Opportunities

- Willing negotiating partner

- Unable to use all of District's allocation

Treatment Blending Requirements

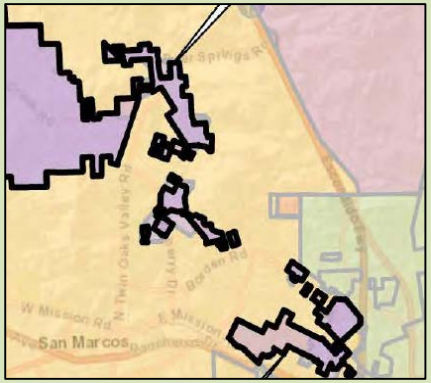
Reductions in treated water demands

Exchange benefit to District may not be large

Net Transfer Benefits After Local Water System Costs

Scenario	Description	Net Unit Revenue
Low (Pessimistic)	• Escondido average annual utilization: **1,500 AF/yr** • Unit Purchase Price: mid-point between local water system costs and Water Authority rate	**$320/AF**
Mid-Range	• Escondido average annual utilization: **2,000 AF/yr** • Unit Purchase Price: mid-point between local water system costs and Water Authority rate	**$420/AF**
High (Optimistic)	• Escondido average annual utilization: **2,500 AF/yr** • Unit Purchase Price: mid-point between local water system costs and Water Authority rate	**$530/AF**

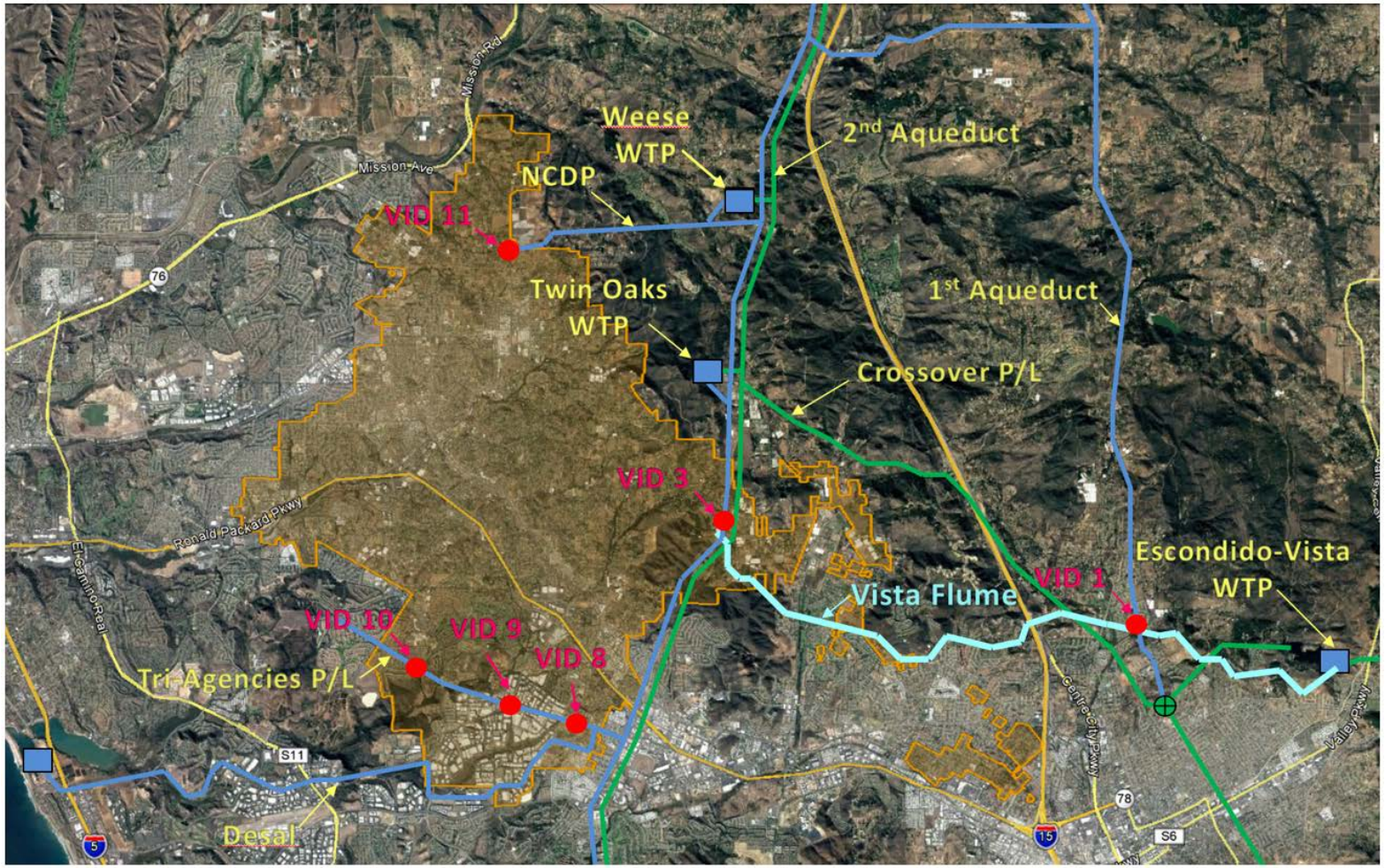
Box 2:
System Improvements (w/o Flume)



J.P. Semper, P.E. – Brown and Caldwell

Doug Gillingham, P.E. – Gillingham Water

Delivery Reliability: Improvements may be needed to compensate for loss of Vista Flume



- Issue is reliability during scheduled 10-day aqueduct shutdowns

Delivery Reliability:
Recommended portfolio:

SDCWA Isolation Valve Project

Scheduled for FY22-23*

Oceanside and VID Interconnects

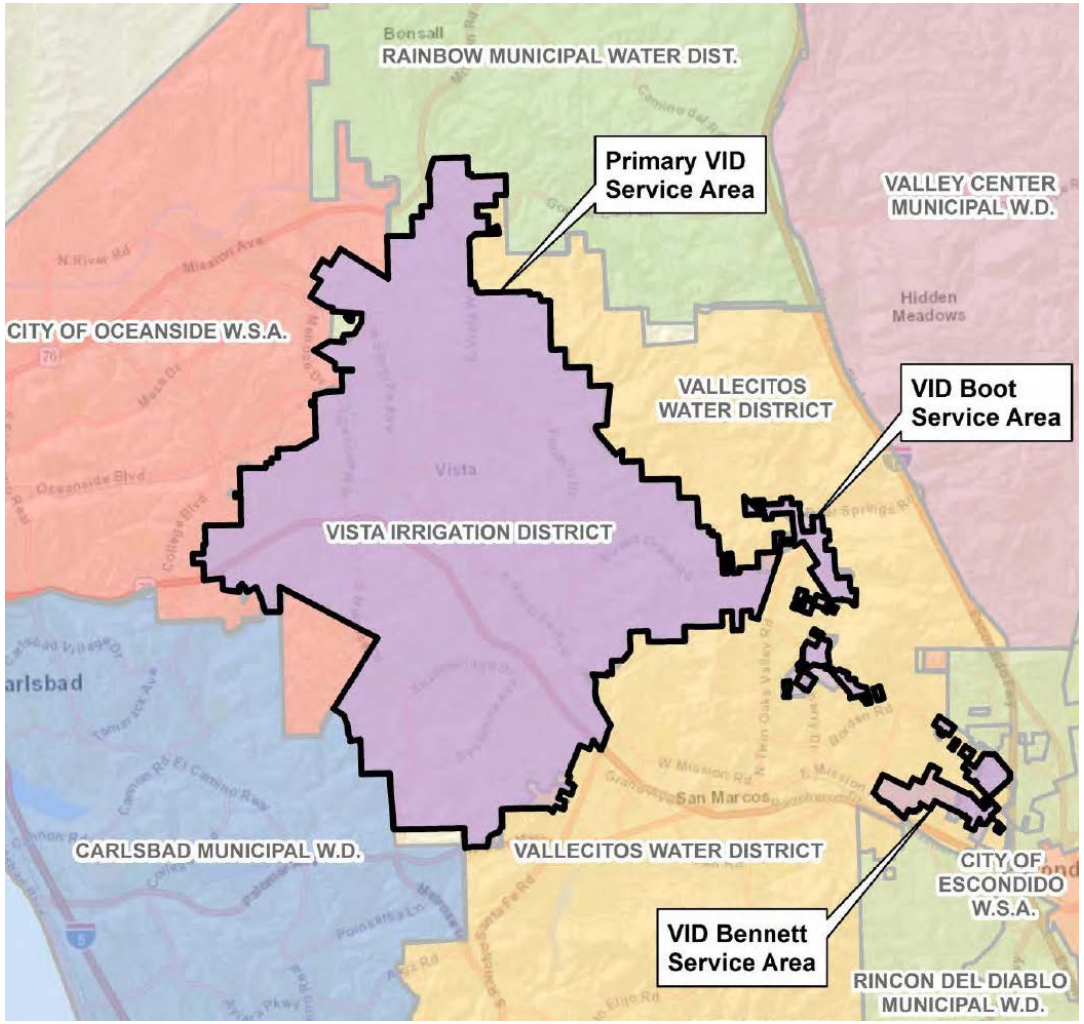
Evaluate modifications as needed

New treated water storage

Enlarge planned Pechstein II Res. **~$15M**

* Schedule subject to change by Water Authority budget process

Boot and Bennett: Retirement of Flume likely to accelerate transfer to Vallecitos



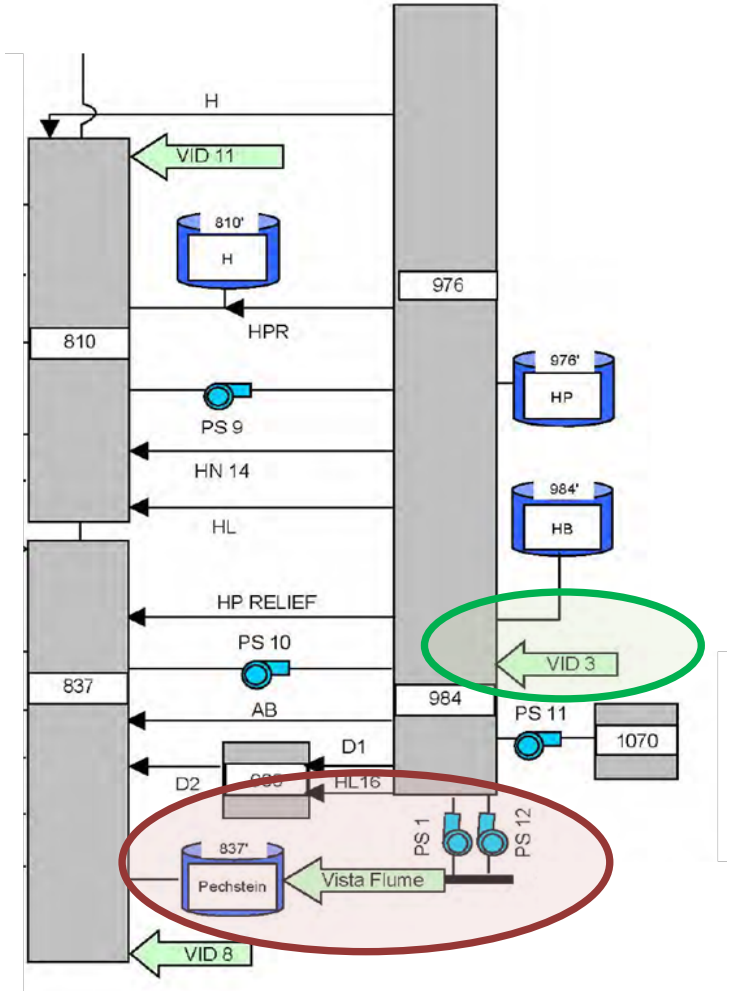
- LAFCO reorganization process
- Mid-Range cost to District = **$17M**
- Low/High = $6M / $33M

Boot and Bennett: Retirement of Flume likely to accelerate transfer to Vallecitos

Boot and Bennett De-annexation Costs to District

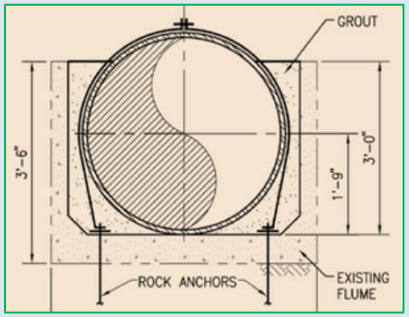
Scenario	Description	Cost		
		Boot	Bennett	Total
Low (Optimistic)	Vallecitos waives capacity and annexation fees, but District and Vallecitos split infrastructure transfer fees.	$2M	$4M	**$6M**
Mid-Range	Vallecitos and District split annexation, capacity, and infrastructure fees.	$5M	$12M	**$17M**
High (Pessimistic)	District pays full annexation, capacity, and infrastructure fees	$9M	$24M	**$33M**

Reduced Pumping Costs: Use of VID3 reduces annual and capital pumping costs



- Reduces pumping to 984/976 zone
- Annual O&M cost savings = ~$80,000/yr
- Annual power cost savings = ~$130,000/yr
- Avoided capital =~$5M
- Unit cost savings =~$90/AF

Box 1:
Flume Rehab / Replacement



Paige Russell, P.E. – Brown and Caldwell

J.P. Semper, P.E. – Brown and Caldwell

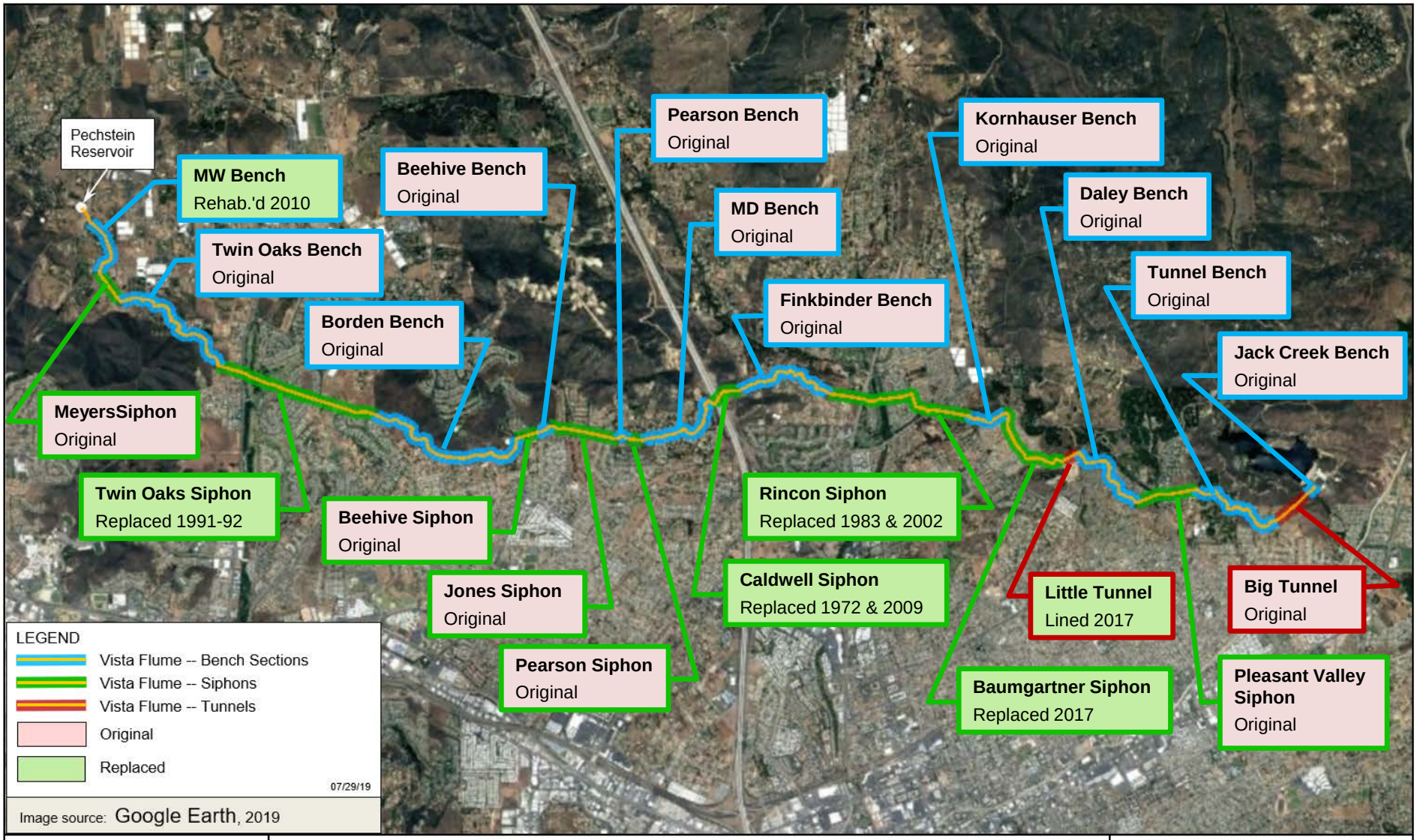


Figure 1

Water Supply Planning Study

VISTA FLUME BENCH, SIPHON, AND TUNNEL REACHES

VISTA IRRIGATION DISTRICT

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

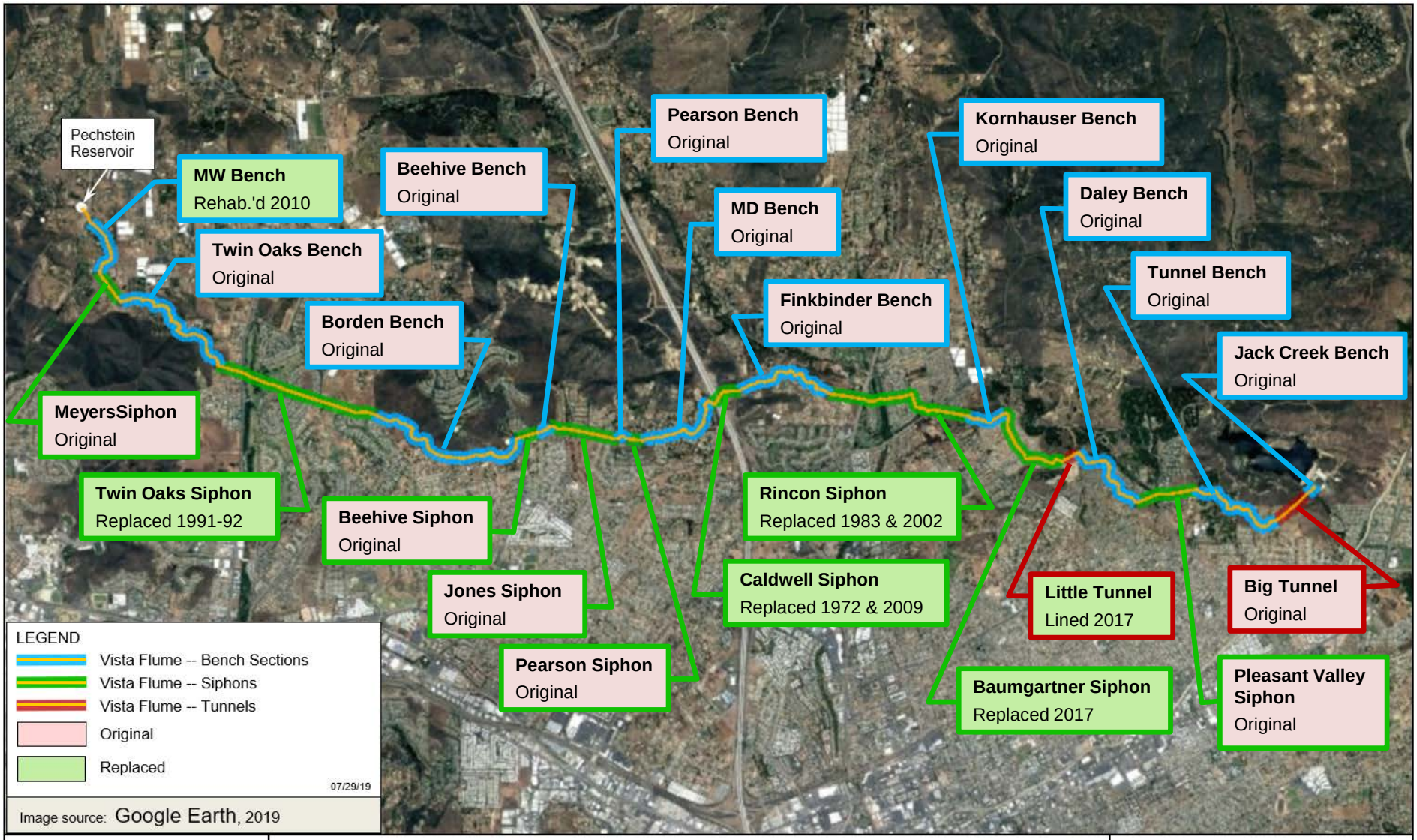


Figure 1

Water Supply Planning Study

VISTA FLUME BENCH, SIPHON, AND TUNNEL REACHES

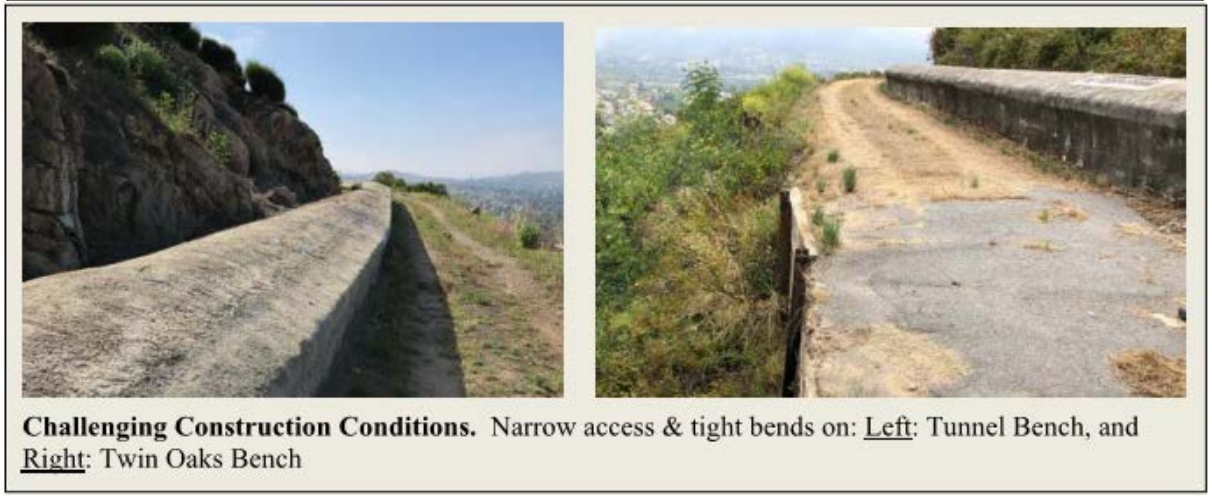
VISTA IRRIGATION DISTRICT

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

Condition Assessment Review

Many benches unsuitable for reuse

Not suitable for reuse. Left: Roof separation, Borden Bench; Right: Erosion under Daley Bench



Challenging Construction Conditions. Narrow access & tight bends on: Left: Tunnel Bench, and Right: Twin Oaks Bench

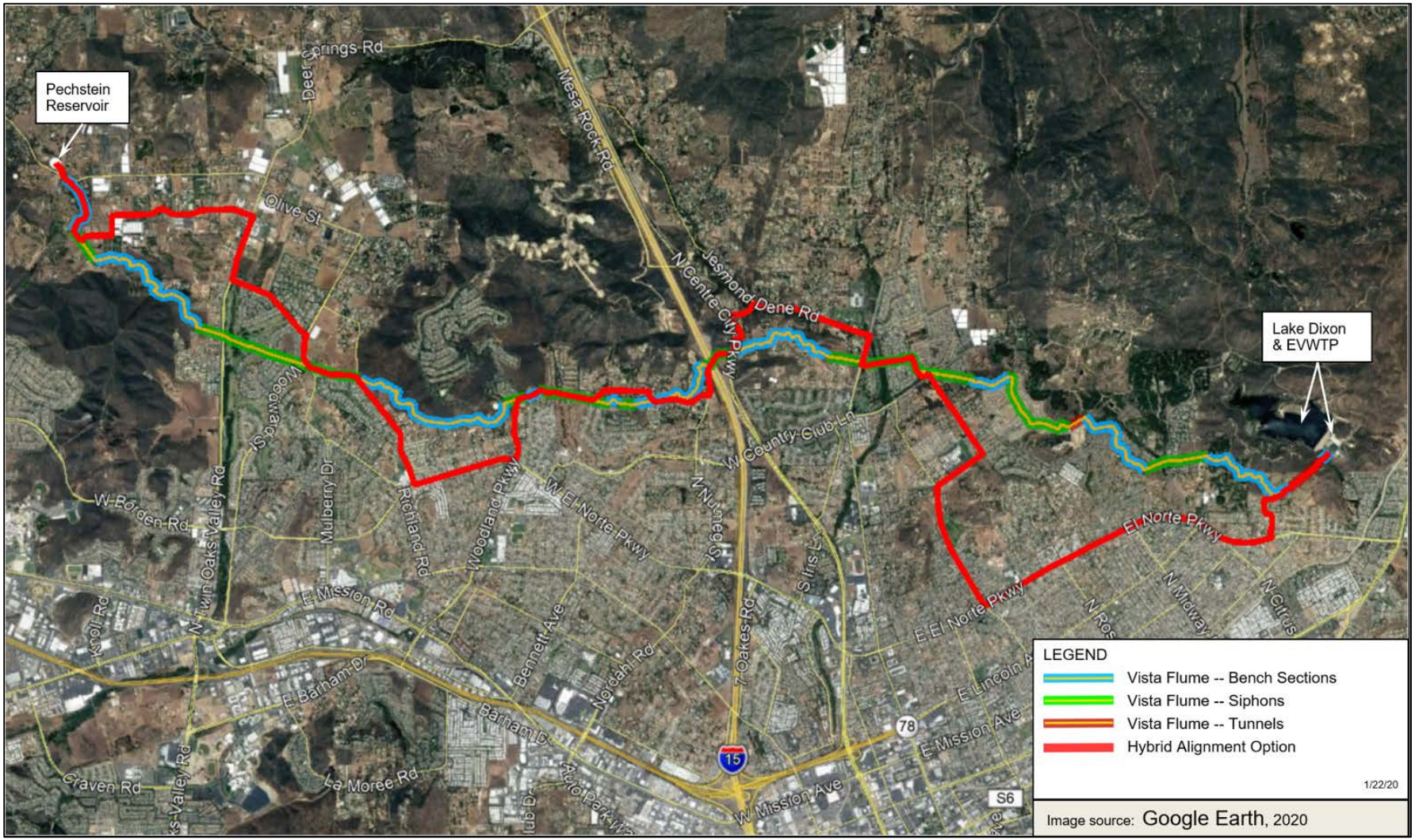
Condition Assessment Review

Siphons likely to require structural rehab/replacement

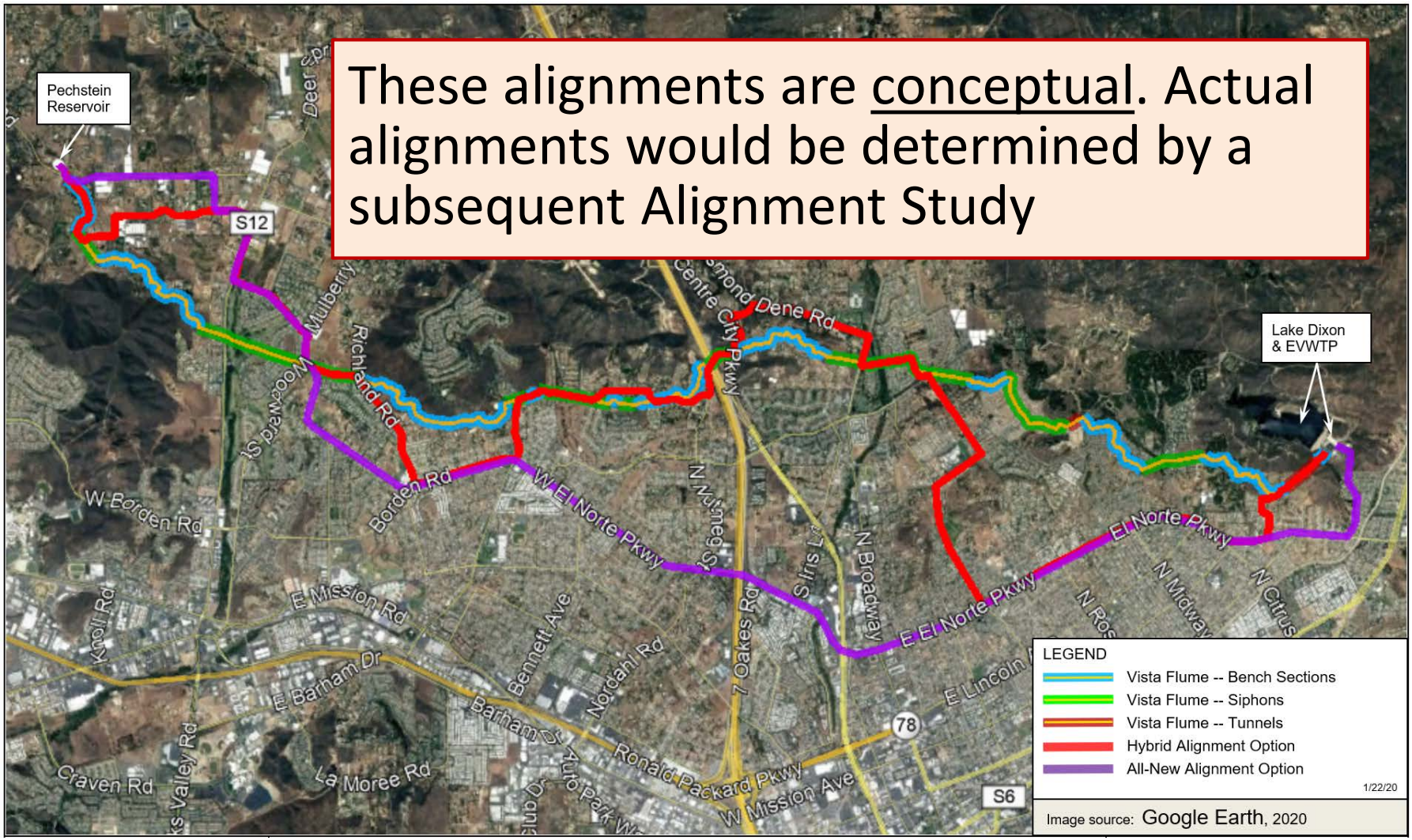
Siphon Asset Management Approach

1. We have assumed most sections will require replacement
2. Condition Assessment work warranted to confirm

Conceptual Alignments: Only a few reaches usable in Hybrid alignment



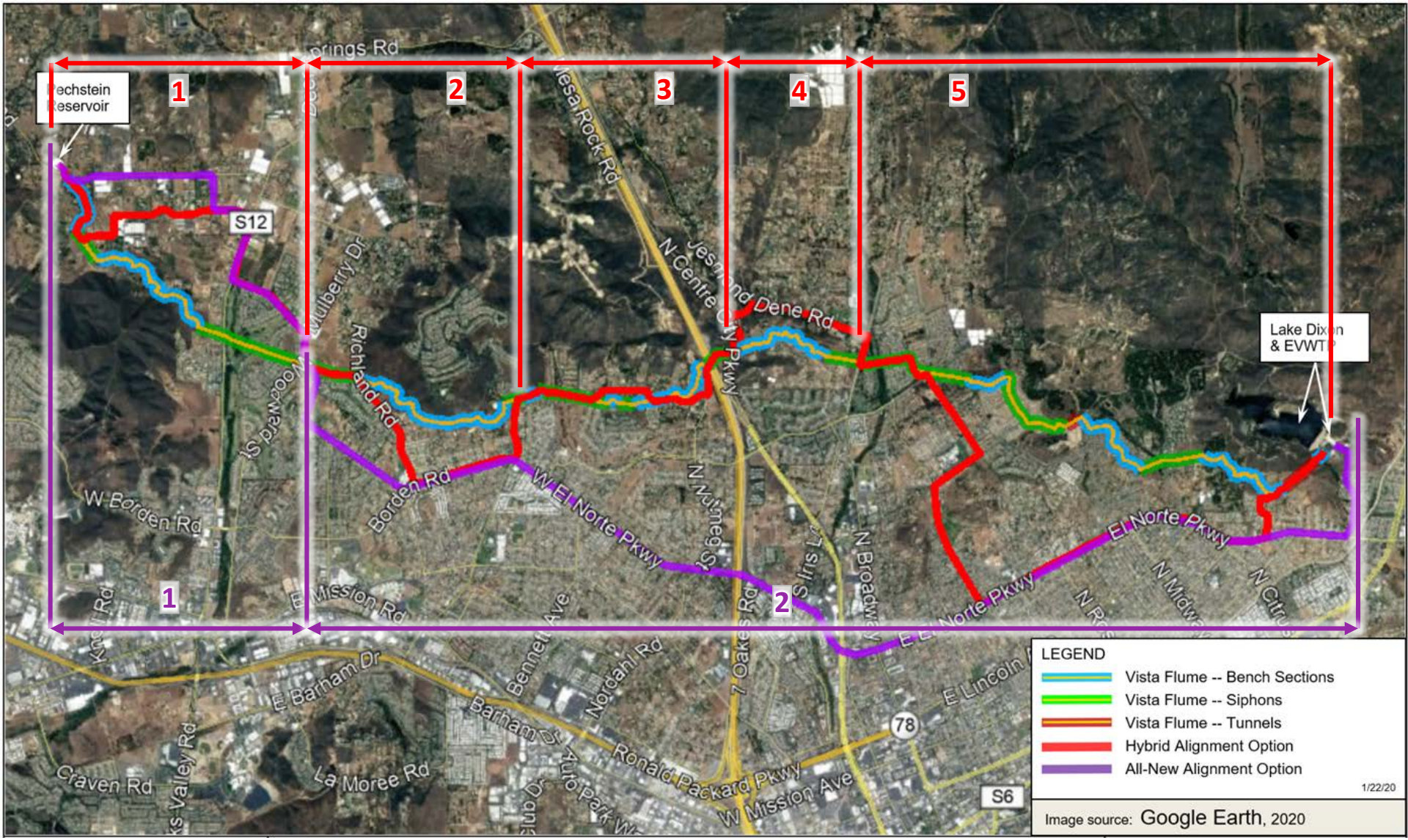
Conceptual Alignments: All-New alignment is shorter length, lower cost



Preliminary Cost Estimates

Concept-Level Capital Cost Estimates		
Cost Item	**Hybrid (millions)**	**All-New (millions)**
New Pipeline	$59	$58
Connections, Valving, Flow Control, etc.	$10	$10
Siphon Structural Relining	$5.5	--
Bench Demolition and Siphon Abandonment	$6.5	$8
Contingency @ 25%	$20	$19
Subtotal – Construction Cost	**$101**	**$95**
Design / Administration / Permitting / ROW @ 23%	$23	$22
Foregone Local Water During Construction	$2	--
Total Project Cost	**$126**	**$117**
Total Project Cost (Rounded)	**$130**	**$120**

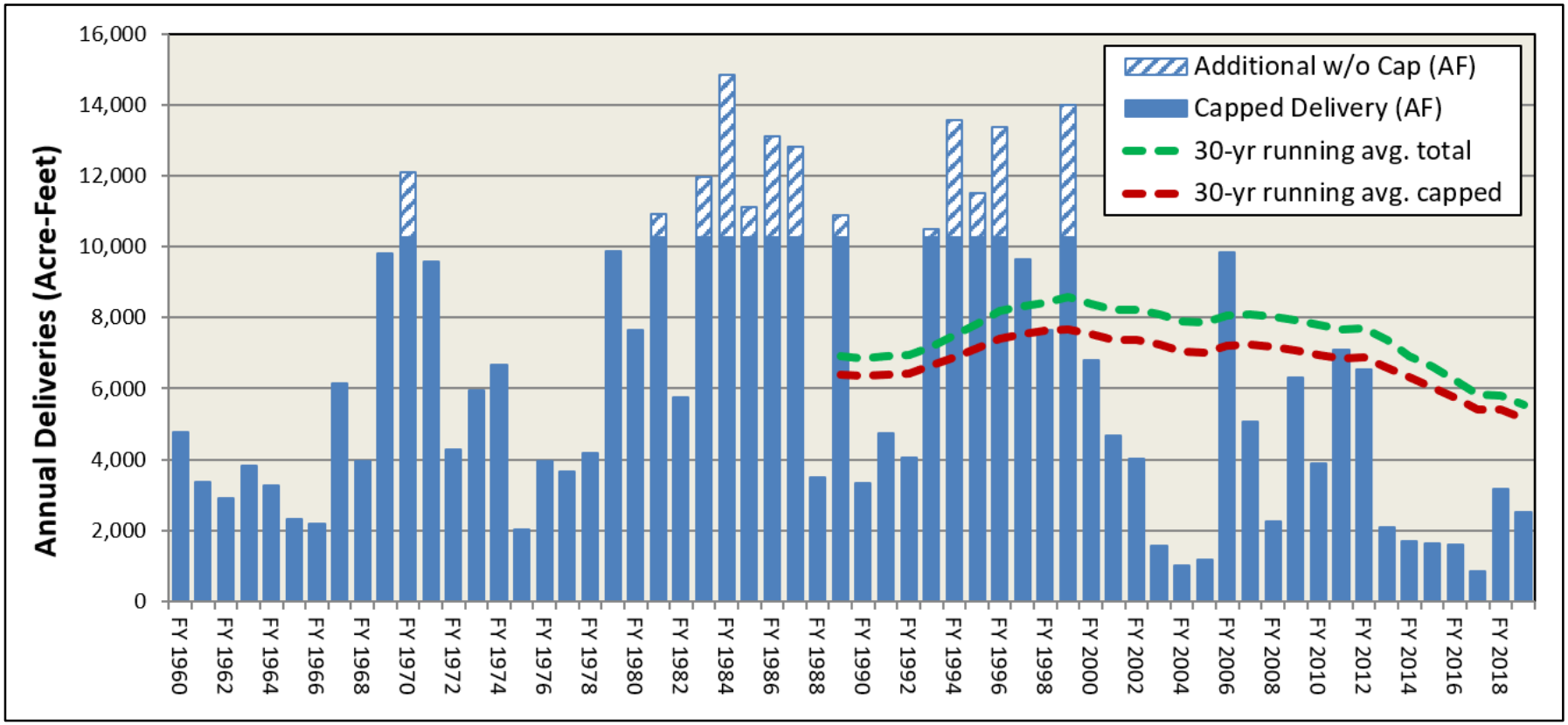
Construction Phasing



CONCLUSIONS

1. Local Yield: Mid-Range Avg. = 5,000 AF/yr

Local Water Deliveries to District 1960-2018



2. Water Authority Rates: Likelihood that rates will increase faster than inflation

Water Authority "All-In" Rates CY2020:

- TREATED: ~$1,700/AF
- RAW: ~$1,400/AF

Scenario	Rate Escalation Assumptions
Low (Optimistic)	• Years 1-5: Inflation + 1.0% • Years 6-30: Inflation
Mid-Range	• Years 1-10: Inflation + 1.5% • Years 11-30: Inflation
High (Pessimistic)	• Years 1-10: Inflation + 2.5% • Years 11-30: Inflation

3. Financial Terms: Favorable Prospect for Obtaining Low-Interest Loans

Drinking Water
State Revolving Fund

DWSRF
(~1.4%/yr)

AMERICA'S WATER
INFRASTRUCTURE ACT

AWIA
(~1.8%/yr)

3. Financial Terms:

Melded Cost of Capital (w/ loans) = 2.5%/yr

Project Finance Rates and Terms

Scenario	Assumption	Interest Rate (%/yr)
Low (Optimistic)	• DWSRF loan funds 75% of capital • District funding of balance @ 3.0%	**1.8**
Mid-Range	• DWSRF loan funds 50% of capital • District funding of balance @ 3.5%	**2.5**
High (Pessimistic)	• No low-interest loan funding • District funding of balance @ 4.0%	**4.0**

3. Financial Terms: Last ones:

- **Water System Cost Inflation = 3.0%/yr**
- **District Internal Discount Rate = 3.0%/yr**

First-Year Cost Comparison

Equivalent Unit Costs in $2020

NOT TO FLUME	
Increased Water Authority Purchases	$1,700/AF
Local System Cost	$720/AF
Exchange Benefit	($420/AF)
Delivery Reliability	$140/AF
Boot and Bennett Transfer to Vallecitos	$160/AF
Reduced Pumping	($90/AF)
TOTAL (Rounded)	**$2,200/AF**

TO FLUME	
Local System Cost	$720/AF
Water Treatment	$200/AF
Flume Replacement	$1,150/AF
Flume O&M	$20/AF
Self-Treatment Benefit	($110/AF)
TOTAL (Rounded)	**$2,000/AF**

30-Year Cost Comparison

Costs in $2020, millions

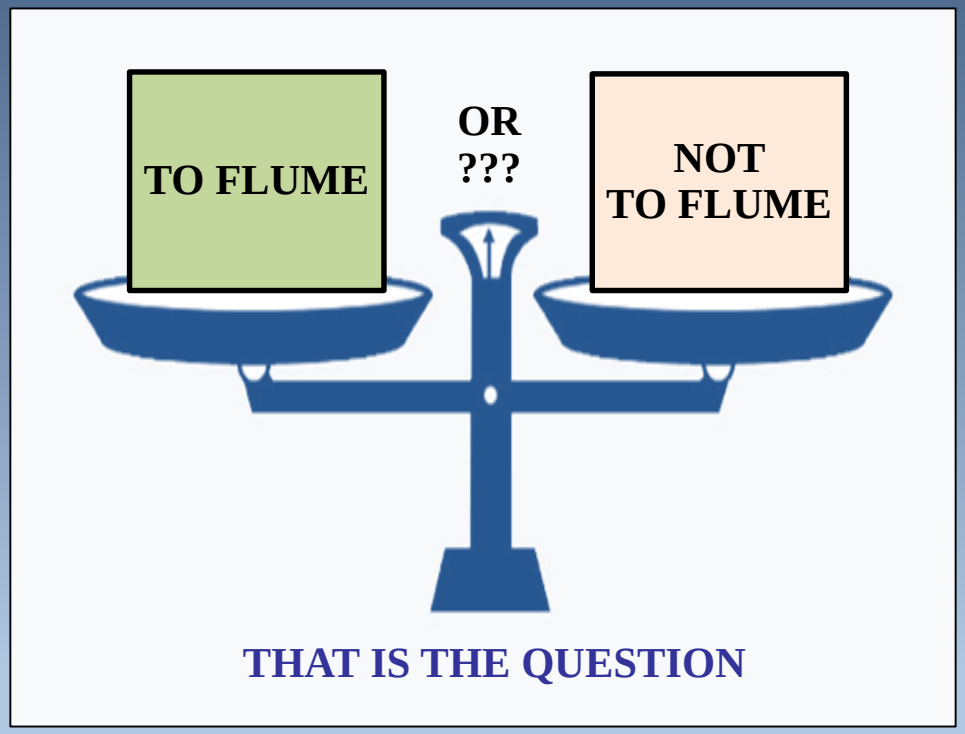
NOT TO FLUME	
Increased Water Authority Purchases	$287
Local System Cost	$108
Exchange Benefit	($63)
Delivery Reliability	$15
Boot and Bennett Transfer to Vallecitos	$17
Reduced Pumping	($11)
TOTAL (Rounded)	**$350**

TO FLUME	
Local System Cost	$108
Water Treatment	$30
Flume Replacement	$113
Flume O&M	$3
Self-Treatment Benefit	($17)
TOTAL (Rounded)	**$240**

Comparison of Major Non-Cost Components

NOT TO FLUME	Evaluation Factor	TO FLUME
↓	Maximize Service Reliability and Operational Effectiveness	↑
→	Minimize Environmental Impacts / Protect Environmental Resources	→
↑	Implementability – Capital Outlay Expenditures	↓
→	Implementability – Other Risks and Opportunities	↑
↓	Regional Cooperation	↑
?	Intrinsic Values	?

SENSITIVITY ANALYSIS



Sensitivity Analysis: Individual Variables

Cost Variable	Assumption	30-Yr. Costs[1]	
		Not To Flume	To Flume
Baseline Condition	all Mid-Range assumptions	**$350M**	**$240M**
1. Interest Rates	Before: 2.5% After: 4.0%	$350M	⇧ $260M (+$20M)
2. Water Authority Rate Escalation	Before: inflation + 1.5% next 10 years, thereafter at inflation After: inflation + 1% for next 5 years, thereafter at inflation)	⇩ $330M (-$20M)	$240M
3. Exchange Opportunities	Before: $420/AF benefit After: $530/AF benefit	⇩ $330M (-$20M)	$240M
4. System Improvements	Before: $17M After: $6M	⇩ $340M (-$10M)	$240M
5. Flume Replacement	Before: Per Estimate ($113 NPV) After: Estimate + 25%	$350M	⇧ $270M (+$30M)
6. Average Local Yield	Before: 5,000 AF/yr After: 4,000 AF/yr	⇩ $290M (-$60M)	⇩ $230M (-$10M)

Sensitivity Analysis: MULTIPLE Variables

(With all adjustments made in favor of Not To Flume)

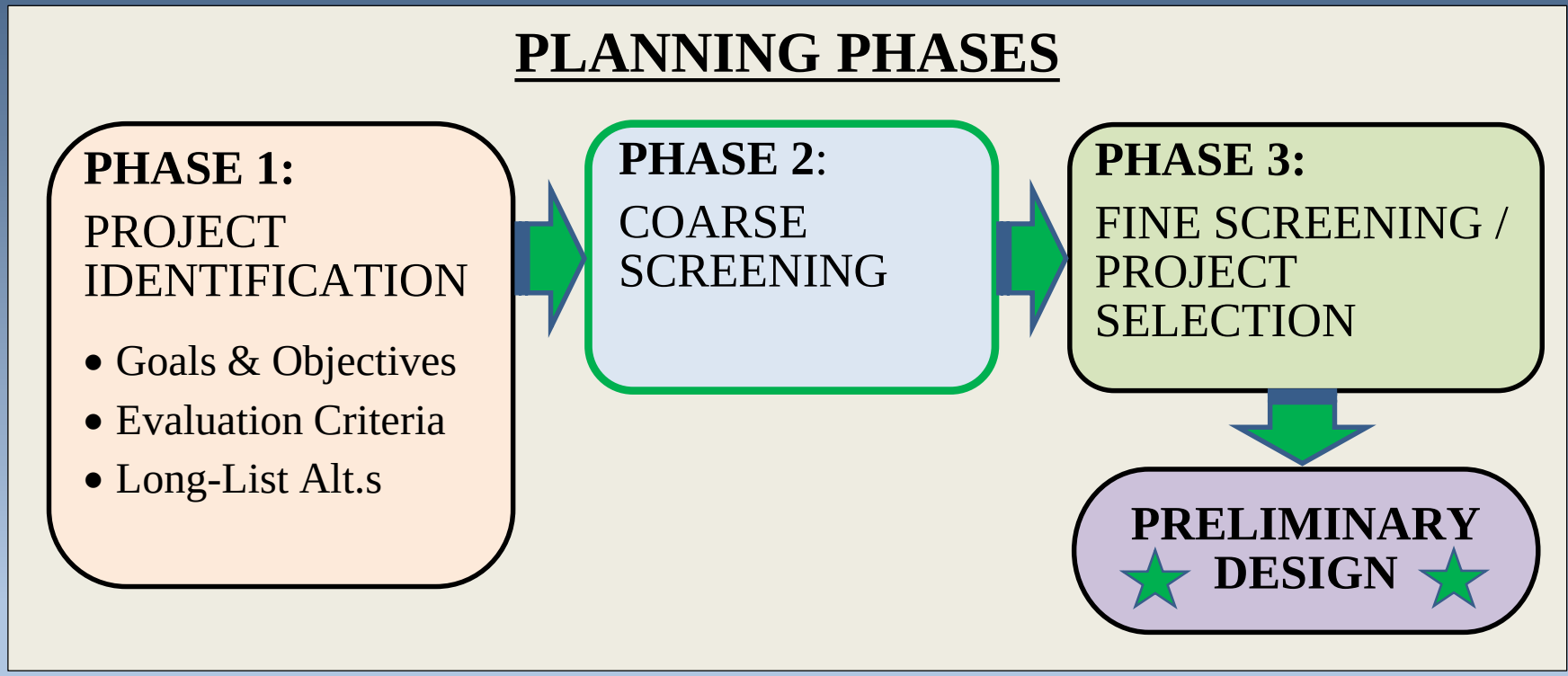
Cost Variable	30-Yr. Costs	
	Not To Flume	To Flume
Baseline Condition	**$350M**	**$240M**
First Five of Six 1) Interest Rates 2) Water Authority Rate Escalation 3) Exchange Benefits 4) System Improvements 5) Flume Replacement	⇩ $300M (-$50M)	⇧ $290M (+$50M)
Six of Six Above plus: 6) Average Local Yield	⇩ $240M (-$110M)	⇧ $280M (+$40M)

Sensitivity Analysis: MULTIPLE Variables

(With all adjustments made in favor of To Flume)

Cost Variable	30-Yr. Costs	
	Not To Flume	To Flume
Baseline Condition	**$350M**	**$240M**
First Five of Six 1) Interest Rates 2) Water Authority Rate Escalation 3) Exchange Benefits 4) System Improvements 5) Flume Replacement	⇧ $400M (+$50M)	⇩ $205M (-$35M)
Six of Six Above plus: 6) Average Local Yield	⇧ $485M (+$135M)	⇩ $215M (-$25M)

NEXT STEPS / SCHEDULE



Next Steps: Not To Flume

Action	Schedule / Budget
1. **Flume Retirement Planning**	12-24 months $0. 5M - $0.75M
2. **Boot and Bennett Transition**	12-24 months $0.25M - $0.75M
3. **Delivery Reliability / Pechstein II**	12-24 months $0.25M - $0.75M
4. **Escondido Water Purchase Agreement**	12-24 months $0.25M - $0. 5M
TOTAL	12-24 months $1.25M - $3M

Next Steps: To Flume

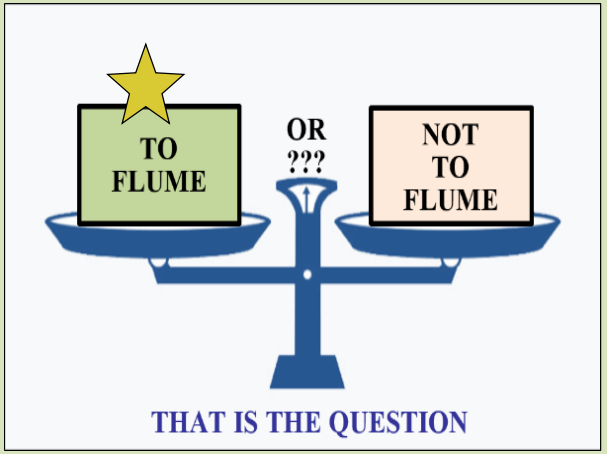
Action	Schedule / Budget
1. Alignment Study	18-24 months $0.75M - $1.25M
2. Environmental Documentation	18-24 months $0.75M - $1.25M
3. Financial Planning	12-18 months $0.1M - $0.25M
4. Miscellaneous • Average Local Yield: Refine estimates	12-18 months $0.1M - $0.25M
TOTAL	24-36 months $1.7M - $3M

One last thing:

Our goal has been to provide you with analysis that is:

- ❑ **Clear,**
- ❑ **Complete, and**
- ❑ **Objective**

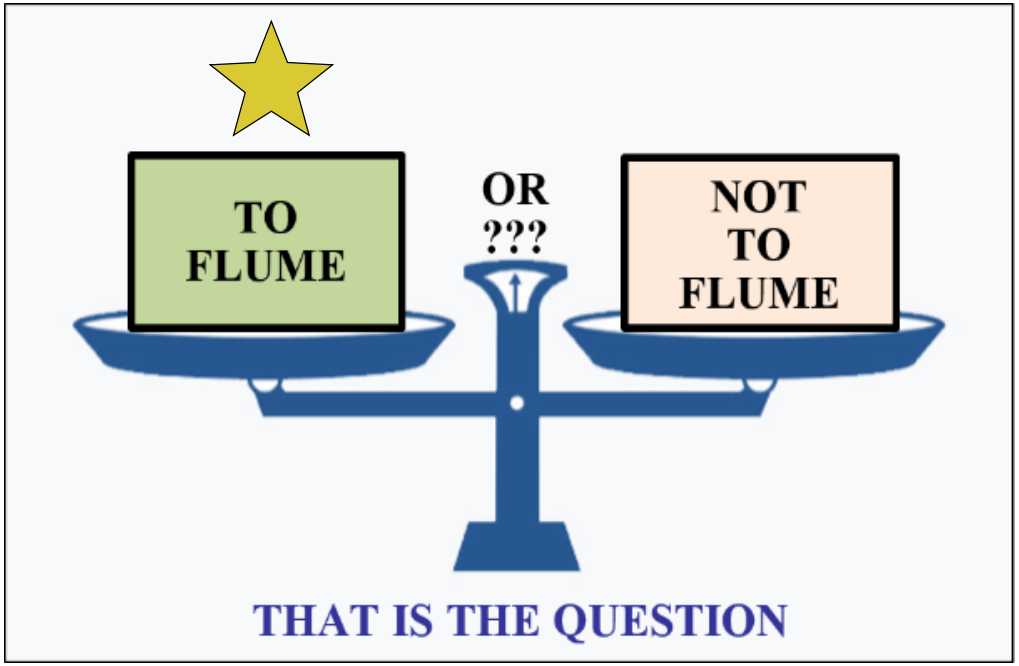
To support a decision you can make with confidence



VISTA IRRIGATION DISTRICT

Water Supply Planning Study

Workshop No. 3 – Fine Screening



March 11, 2020

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