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

August 8, 2019

A Special Meeting of the Board of Directors of Vista Irrigation District was held on Thursday, August 8, 2019 at the offices of the District, 1391 Engineer Street, Vista, California.

1. CALL TO ORDER

President MacKenzie 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, Marlene Kelleher, Director of Administration; and Ramae Ogilvie, Administrative Assistant.

Other attendees: Doug Gillingham, Gillingham Water; Don MacFarlane, DLM Engineering; Ken Weinberg, Weinberg Water Resources; J.P. Semper, Brown and Caldwell; and Paige Russell, Brown and Caldwell.

Also in attendance as an observer was Tom Bloomer of Murraysmith.

3. PLEDGE OF ALLEGIANCE

Director Miller led the pledge of allegiance.

4. APPROVAL OF AGENDA

19-08-84	***Upon motion by Director Dorey, seconded by Director Miller and unanimously carried (5 ayes: Miller, Vásquez, Dorey, Sanchez, and MacKenzie), the Board of Directors approved the agenda as presented.***

5. PUBLIC COMMENT TIME

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

6. WATER SUPPLY PLANNING STUDY

Director of Engineering, Randy Whitmann provided a brief overview of the previous Water Supply Planning Study (Study) Workshop held on April 18, 2019, recalling that the discussion focused on the 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), the project goals and objectives, and the evaluation criteria to be used. Mr. Whitmann stated that since the previous workshop, the project team (Team) has evaluated the long list of

alternatives at a course screening level, and the purpose of today's workshop is to review the findings and seek the Board's input regarding which alternatives to advance to the next phase of the Study, the fine screening analysis.

Mr. Whitmann introduced Doug Gillingham of Gillingham Water Planning and Engineering, Inc. who introduced the key members of his team: Don MacFarlane of DLM Engineering; Ken Weinberg of Weinberg Water Resources Consulting, LLC; J.P. Semper and Paige Russell of Brown and Caldwell. Mr. Gillingham and the Team members to follow presented the information via a PowerPoint presentation (attached hereto as Exhibit A). Mr. Gillingham stated with the course screening analysis complete, the question of whether "to Flume or not to Flume" is still a toss-up.

Mr. Don MacFarlane reviewed cost considerations for the "to Flume" and "Not to Flume" options. The "to Flume" option took into consideration local water costs plus treatment costs in addition to the repair and replacement costs of the Flume. The "Not to Flume" option considered remaining cost obligations less salvage value. Mr. MacFarlane stated the Team took an asset management approach to budgeting for repair and replacement of the Flume and local water system facilities, adding that the analysis of the local water system costs concluded that more investment would be needed for long-term sustainability of the Flume. He stated that the Team analyzed three estimated levels of costs for the annual operation, maintenance, repair and replacement of the assets related to operation of the Flume, with the mid-range assumption (60 years of life left to the assets) being used for the course screening analysis. The total mid-range cost would be $3.4 million. Mr. Gillingham stated that the long-term average annual yield of the system is 5,000 acre-feet (AF) per year and that said yield is being used as the basis in the annual cost per acre foot analysis. This average yield results in a mid-range unit cost of $690 per AF before treatment at Lake Dixon, and $890 per AF with treatment. Mr. Gillingham concluded that this cost is modest in comparison to the San Diego County Water Authority (Water Authority) all in treated water rate of $1,700 per AF.

Mr. MacFarlane stated that the District's opportunities to reduce costs in the "Not to Flume" option are limited, primarily due to the San Luis Rey Indian Water Rights Settlement Agreement (Settlement). The only real cost reductions possible would be if another party were to assume ownership of the facilities. Mr. MacFarlane clarified that for the analysis the assumption is that the Escondido canal would be kept and maintained as it has been historically with major failures assumed around every five years.

Mr. Ken Weinberg presented ways to offset the increased cost of purchasing water from the Water Authority through exchange agreements with neighboring agencies, including the Water Authority, the City of Escondido (Escondido), Rincon del Diablo Municipal Water District (Rincon), Valley Center Municipal Water District (Valley Center), the San Luis Rey Indian Water Authority (SLRIWA), Rainbow Municipal Water District (Rainbow), Yuima Municipal Water District (Yuima), or Vallecitos Water District (Vallecitos). He discussed scenarios and financial constraints with each agency based on the need for new and oversized facilities, demand and water quality limitations, no financial incentives, or no revenue generation; none of the scenarios present a significant economic benefit to the District. Mr. Weinberg stated that the most viable exchange partner would be Escondido with Rincon. Mr. Hodgkiss interjected that Escondido may be the only viable exchange partner, as Escondido is the only agency that is also a party to the Implementing Agreement which requires that only the parties involved may use and benefit from the local water. Mr. Hodgkiss said that this issue will be analyzed more closely during the fine screening process. Mr. Gillingham summarized that the Team believes exchanges and transfers are feasible and they would present a win/win partnership opportunity; however, these exchanges and transfers are unlikely to generate very much additional revenue on top of the existing costs of the local water system. Based on this, the analysis assumes a mid-range exchange scenario that provides a $75 per AF net revenue gain.

Mr. J.P. Semper reviewed the Team's analysis regarding system improvements that would be needed if the District were to retire the Flume. He stated that the District's 2017 Master Plan included alternatives for offsetting the need for the Flume. At that time, it was determined that about 70 million gallons of additional storage would needed at a cost of about $100 million in order to achieve the reliability the Flume currently provides. Since then, another project has been identified that significantly reduces the amount of additional storage required. The Water Authority is planning to install an isolation valve on the second aqueduct during Fiscal Year 2022-23. The valve would allow the District to continue to receive water from the Water Authority during the Water Authority's scheduled 10-day shut-downs, which currently the entire system is shut-down. This project would greatly increase the reliability of the District's system at no additional cost to the District. Mr. Semper said that contingent on the valve installation, the 70 million gallons of additional storage mentioned in the Master Plan as an alternative to the Flume could be reduced to 7.5 million gallons at a cost of approximately $10 million. Mr. Semper said that during the fine screening analysis, there will be more discussions with the Water Authority to track the progress of the valve installation, how it is being budgeted, and its schedule for implementation. Mr. Gillingham said that a joint letter to the Water Authority from the District, City of Carlsbad, and Vallecitos is recommended to emphasize the significant benefit all three agencies would receive from the valve installation, and this letter should seek a formal response from the Water Authority to confirm that the project will go forward.

Mr. Semper discussed the Boot and Bennett areas currently served by the District, which geographically reside within Vallecitos' sphere of influence. He stated that annexation of the Boot area will likely happen in time organically as new development needs connection to sewer service. Mr. Semper said that if the District retires the Flume, this will likely accelerate annexation of the Boot area, and then in turn the Bennet area. If the Flume is retired, the annexation process could result in fees, including capacity and infrastructure transfer fees, to the District being as high as $33 million. The optimistic/low range estimate of the annexation related fees would be approximately $6 million, provided Vallecitos waives the capacity and annexation fees and splits the cost of the infrastructure transfer fees. The mid-range estimate would involve an even split of all costs with Vallecitos, resulting in a cost of approximately $17 million each. This mid-range value is assumed in the analysis.

Ms. Paige Russell reviewed the sections of the Flume, siphons, and tunnels that have already been replaced. She reviewed the original assumptions that were used to estimate the cost of replacing or rehabilitating the Flume, stating that the new estimates are much higher because most of the benches will have to be replaced instead of rehabilitated due to their poor condition and many will require bypasses due to difficult construction conditions in their current alignments. Additionally, the siphons will likely require structural rehabilitation or replacement given their age, and future condition assessments are warranted to confirm. She outlined a possible plan for Flume replacement the Team refers to as the "hybrid" plan in which some sections are replaced as a priority, while other newer sections are deferred; some sections are replaced in their current alignments, while others are replaced in new alignments. Ms. Russell compared the hybrid plan to an alternate plan in which an entirely new 36" buried pipeline is constructed in an all new alignment. An advantage with the hybrid plan is that District can keep the newer facilities and maintain some prior easement rights. An advantage with the all-new pipeline alignment is that it can be fully pressurized. Director Dorey said another advantage with the all-new pipeline alternative would be the opportunities to make connections and deliver water to other agencies along the way, which wasn't possible with the Flume. Ms. Russell said that the cost estimates for the hybrid plan and the all-new pipeline alternative both come in at about $115 million. She stated that in the fine screening phase of the Study, the Team will look for cost-saving alternatives for both alternatives, such as using PVC pipe instead of steel.

Ms. Russell pointed out more pros and cons between the hybrid plan versus the all new pipeline alternative. She stated that the hybrid plan would allow the District to break the project up into at least six packages (with a possibility of sub-packages) providing the District with the opportunity to rehabilitate the most critical sections first. Ms. Russell stated that this could be fiscally advantageous for the District and

could possibly even allow the District to "pay as you go". In the all new pipeline alternative, the project could be constructed in two packages, but the entire project would need to be done in a much shorter timeframe which would be a very sizable capital expense all at once.

Ms. Russell said that moving into the fine screening phase the Team will analyze in depth issues such as pressurization, hydraulics and capacity, and alignment sub-alternatives based on material, size, method, and route. Construction phasing will also be addressed in the fine screening phases of the Study. Director Miller commented that he liked the idea of phasing the project and receiving the benefit of the sections in which the District has already invested. There was a brief discussion regarding financing for the different options. Director Sanchez asked staff to continue to investigate seeking grants and other financing instruments to help pay for project costs. Mr. Gillingham responded that there is potential for low interest financing through the State Revolving Fund.

Mr. Gillingham stated that there are certain variables to keep in mind when considering whether to "to Flume" or "Not to Flume" such as Water Authority rates, which could increase at a rate faster than inflation. He noted that exchange benefits could increase over time, but are not likely to be significant. He commented that local water system costs will inflate but not likely faster than inflation; and the Flume replacement cost once financed, will remain flat. The estimated Flume replacement cost of $115 million translates into $1,080 per AF and currently the "to Flume" and "Not to Flume" alternatives are tied with total water costs estimated at $1,900 per AF. In the fine screening phase, all the variables will be weighed carefully, and it is expected that they could start to tip the scales one direction or the other. Mr. Gillingham reviewed some of the major non-cost factors, such as service reliability, environmental impacts, implementability, capital outlay expenditures, risks and opportunities, and other intrinsic values. Mr. Gillingham commented that even with the Water Authority's valve installation in the future, it would still be beneficial to have the Flume in rare instances when there could be an aqueduct failure.

Director Miller commented that without the Flume the District would be fully subject to the rates set by the Water Authority; however, with the Flume the District could exercise some measure of control over its cost of water (at least for an average of 5,000 AF per year). Director Dorey commented that the District's water supply from Lake Henshaw has diminished over time, and he wondered if the supply will continue to shrink in the future. Director Sanchez said that the option that makes the most sense fiscally will carry the most weight in this decision, but reliability will also be a very important factor. Director MacKenzie commented that the Board will need time to digest all of this information.

Mr. Gillingham clarified statements about the Boot and Bennet areas, indicating that if these areas were annexed to Vallecitos because of development the developers would have to incur the cost of the transfer; however, if the annexation becomes necessary because the District decides to retire the Flume, the District would incur the costs. President MacKenzie suggested that one area could be annexed sooner than the other, and she asked that these areas be addressed separately in the fine screening phase.

Mr. Gillingham discussed six sensitivity issues. 1) 5,000 AF is the average local yield per year through the Flume. It could be more, and it could be less; however, for the sake of discussion 5,000 is what will continue to be assumed. 2) The assumption for the fine screening analysis will continue to be that the Water Authority rates could increase faster than inflation. 3) Financial terms, low-interest loans, and borrowing capacity have all been studied using the assumption of a mid-range finance cost of 3.5 percent per year, a fluctuating number that may be reassessed for the next phase. Low interest loan opportunities will also be assessed in the fine screening analysis. 4) The estimated exchange revenues cover a very broad range from the worst case to the most optimistic; these scenarios will be reviewed again and the Board will determine the appropriate range for decision-making. 5) Flume costs will be reviewed by other parties including an independent contractor and construction management firm during the fine screening phase. 6) The design of the Flume replacement project would be subject to review and permitting by the Division of

Drinking Water. Pressurization is the industry standard for treated water and is more secure than non-pressurized conveyance; the new alignment would be pressurized.

Mr. Gillingham stated that the next workshop will be to present the findings of the fine screening phase of the Study, which will be in November or December 2019. The Board thanked Mr. Gillingham and his team for an excellent presentation.

7. COMMENTS BY DIRECTORS

None were presented.

8. COMMENTS BY GENERAL MANAGER

Mr. Hodgkiss stated that Harassment Prevention Training for the Board and supervisorial staff has been confirmed with Gordon Graham for November 4, 2019 at 2:00 p.m.

9. ADJOURNMENT

There being no further business to come before the Board, at 11:27 a.m. President MacKenzie adjourned the meeting.

Jo MacKenzie, President

ATTEST:

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

VISTA IRRIGATION DISTRICT

STAFF REPORT

Agenda Item: 6

Board Meeting Date: **August 8, 2019**
Prepared By: **Randy Whitmann**
Approved By: **Brett Hodgkiss**

SUBJECT: WATER SUPPLY PLANNING STUDY

RECOMMENDATION: Conduct Water Supply Planning Study workshop.

PRIOR BOARD ACTION: On October 10, 2018, the Board approved the Request for Proposal for a Water Supply Planning Study, and on January 23, 2019, authorized the General Manager to enter into an Agreement for Professional Services with Gillingham Water in an amount not to exceed $324,800. 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.

FISCAL IMPACT: Unknown at this time. The Water Supply Planning Study will evaluate long-term rehabilitation/replacement of the Vista Flume (Flume) with other alternatives. Once the Water Supply Planning Study is complete, a preferred project alternative will be identified and the estimated costs incorporated into future budgets.

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 San Diego County Water Authority (Water Authority) 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 Water Authority's 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 rehabilitating or 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 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(s) will be 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 coarse screening analysis performed on the 'long-list' of alternatives; the workshop will afford the Board the opportunity to provide input on the findings and recommended 'short-list' of alternatives to be advanced to the final fine screening process.

ATTACHMENTS: Workshop Agenda and Reference Materials

AGENDA

VID Water Supply Planning Study 2019

Board Planning Workshop No. 2

Coarse Screening

9:00 a.m. Thursday August 8, 2019
VID Offices

PURPOSE: 1) Review and refine preliminary findings of Coarse Screening; 2) Review sensitivity of findings to key assumptions and planning scenarios; 3) Confirm priorities for Fine Screening

AGENDA:

1) INTRODUCTION
    a. Summary: Why the balance scale remains level, for now
    b. Refresher: Study overview and highlights of Board Workshop No. 1
    c. Workshop purpose

2) COARSE 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. Conclusions

3) SENSITIVITY ANALYSIS / ISSUES FOR REFINEMENT
    a. Sensitivity Analysis – Variables and scenarios that change the balance scale
    b. Items and issues for refinement during Fine Screening
    c. Fine Screening process and schedule

4) ACTION ITEMS AND NEXT STEPS

5) ADJOURNMENT

VISTA IRRIGATION DISTRICT

Water Supply Planning Study 2019

Workshop No. 2 Briefing Document – COARSE SCREENING

July 29, 2019

Prepared by:

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

Water Supply Planning Study 2019

Workshop No. 2 Briefing Document – COARSE SCREENING

July 29, 2019

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

Interim Report – Subject to Revision

Doug Gillingham, P.E., BCEE
Project Manager

CONTENTS

FIGURES

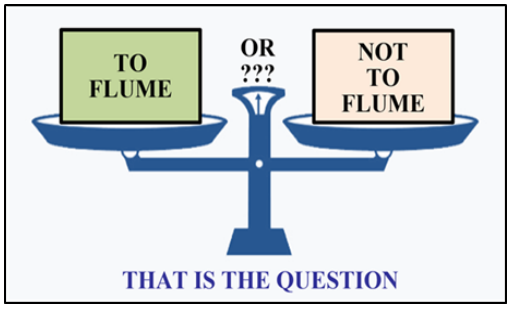
1. Overview / Introduction

Summary:

- At the Coarse-Screening level of preliminary assessment, the balance scale does not yet discern a clear winner between the To Flume and Not To Flume options.
- Board Workshop No. 2 will review the preliminary findings of Coarse Screening, and explore the sensitivity of the findings to assumptions about current and future conditions.
- Subsequent to Workshop No. 2, the project team will move into Fine Screening, and report back to the board late in the year at Workshop No. 3 with refined analysis and recommendations on how to proceed.

1.1. The *preliminary* balance scale remains level for the time being.

Based on the coarse-screening level of preliminary review undertaken to date, the Flume balance scale remains level between the To Flume and Not To Flume options. We wish we could anoint a likely winner, but the coarse screening review comes out even. We'll provide more detail in the body of this document, but here are a few summary points to keep in mind as we go:



- **Costs are High:** The level balance scale finding holds even though the costs of Flume rehabilitation will be higher than the high-end of the previously reported range, and even though long-term maintenance of the Local Water System will require additional investment beyond current budgeted levels.

- **Sensitivity Analysis:** The balance scale is sensitive to many project variables for which a change in assumptions could tilt the scale in either direction. We'll review the most significant of those sensitivities with you later in the document.

- **Fine-Screening Still to Come:** Remember these are preliminary findings, based on coarse-screening. Following your review, the study team will proceed into fine-screening, sharpen our pencils further, and report back later in the year with refined analysis, documentation, and recommendations.

1.2. 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, where it feeds the Flume.

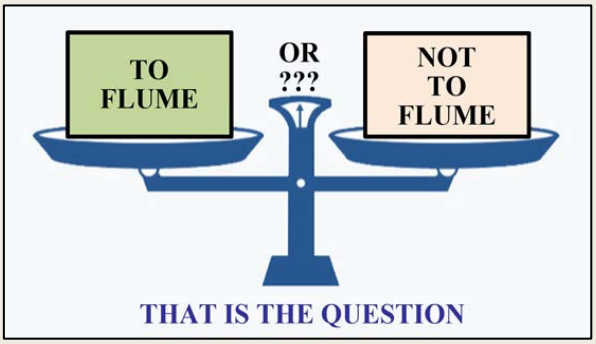
The capital investment needed to replace or rehabilitate the Flume will be significant. Accordingly, prior to making an investment decision, the District wishes to weigh carefully the merits of investing in the Flume against the merits of other water supply alternatives, including that of retiring the Flume altogether and relying on deliveries from the San Diego County Water Authority (Water Authority) in its place. To support its decision, the District is conducting the Water Supply Planning Study 2019 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.

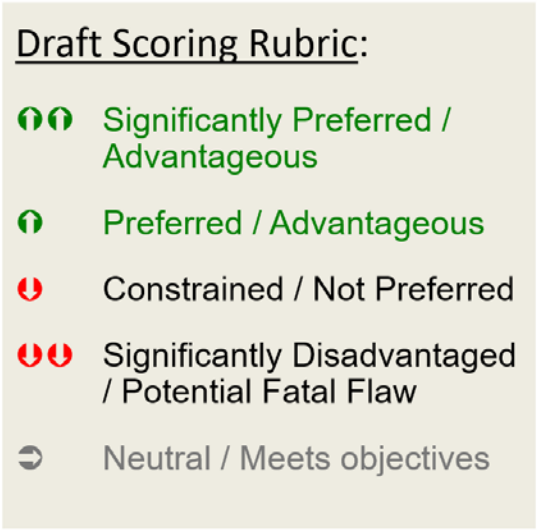


The overarching question. The principal goal of the Water Supply Study is to weigh the alternatives and answer the question, and to do so based on analysis that is clear, complete, and trusted.

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.

NON-COST CRITERIA
Maximize Service Reliability and Operational Effectiveness
Minimize Environmental Impacts / Protect Environmental Resources
Maximize Implementability
Intrinsic Values



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 1.3. 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 screening review.

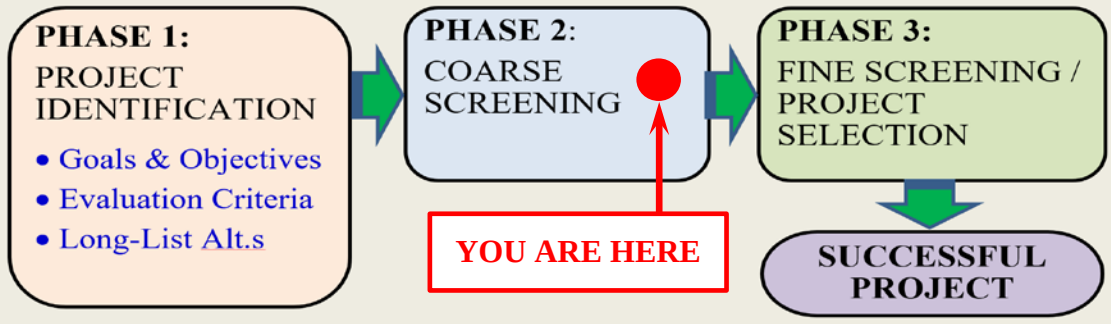
1.3. Study Process: The study is organized into four Investigation Boxes, and sequenced into three phases. Workshop No. 2 will review and refine the preliminary conclusions of Coarse Screening, and set direction for Fine Screening, the study's final phase.

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 (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.

PLANNING PHASES



1.4. 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 the current 2019-2020 fiscal year 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 Vista 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. 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, 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 a rate faster than base inflation. This would mean that on a current-dollar basis, the long-term average unit cost of Water Authority water is higher than the current $1,700/AF rate.

In the coarse screening review, we will utilize the $1,700/AF rate for first-year cost comparisons, and note the potential for that rate to increase over time in real dollars. More detailed review of Water Authority rates, and more complex long-term cost comparisons, will be undertaken during fine screening.

1.5. A quick note on Financial assumptions

The economic comparison of the To Flume and Not To Flume options entails in part 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 the District's cost of funds. Lower interest rates lower the annual costs of capital financing and increase the present-worth value of future annual costs; higher interest rates do the opposite. For the coarse-screening review, we will use a mid-range interest rate of 3.5 percent as summarized in the table below.

District Finance Rates and Terms

Scenario	Description	Interest Rate (%/yr)
Low (Optimistic)	Reflects optimistic bond market conditions and potential for District eligibility for State Revolving Fund low-interest financing	**3.0**
Mid-Range	Current market conditions	**3.5**
High (Pessimistic)	Less favorable market conditions	**4.0**

1.6. 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 the Escondido-Vista Water Treatment Plant (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. For coarse screening, the study will use the mid-range value.

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 30-year average hydrology, 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.

1.7. 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:

- Increased investment will be needed for long-term sustainability.
- Even so, system costs on a dollars per acre-foot basis are modest.
- Under a Not To Flume alternative, most of the District's system costs would continue unless someone else 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 Vista 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 designed three budgetary levels of additional investment: low, median, and high (or optimistic, middle-ground, and pessimistic). Some components, including the Escondido Canal, are budgeted for perpetual repair but not replacement, while others for replacement on varying intervals. Details of the three asset management scenarios are shown in Section 2.4. The resulting budgetary levels, inclusive of current budget items, are summarized in the table below. For coarse screening review, **we will assume the Middle level of investment.**

Annual Operation, Maintenance, Repair, and Replacement Costs

Scenario	Well + Ditches	Henshaw Dam	Escondido Canal	SP Under-grounding	Bear Valley	Other Budget [1]	Total
Existing Budget	$554,000	$214,000	$375,000	$20,000	Included in Esc. Canal	$459,000	**$1.6M**
A) Low [2]	$819,000	$214,000	$435,000	$766,000	$342,000	$459,000	**$3.0M**
B) Middle [2]	$861,000	$362,000	$455,000	$766,000	$399,000	$459,000	**$3.3M**
C) High [2]	$920,000	$706,000	$477,000	$766,000	$479,000	$459,000	**$3.8M**

1. Includes costs not assigned to a facility such as buildings and grounds, legal services, consultants, and insurance
2. Total spending levels, inclusive of existing budget

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

2.2. Even so, 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 yield of the system to the District of 5,000 AF/yr, the existing investment is approximately $320/AF before treatment costs. The three asset management ranges increase that cost to between $610 and $760/AF before treatment. Treatment costs at the EVWTP add approximately $200/AF, $250/AF for asset management scenario C. Unit costs are summarized in the table below.

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
Budget	$1,622,000	5,000	$320/AF	$200/AF	**$520/AF**
A) Low [1]	$3,035,000	5,000	$610/AF	$200/AF	**$810/AF**
B) Middle [1]	$3,302,000	5,000	$660/AF	$200/AF	**$860/AF**
C) High [1]	$3,807,000	5,000	$760/AF	$250/AF	**$1,010/AF**

1. Total spending levels, inclusive of existing budget

The Middle Range estimate of **$660/AF** before treatment represents an approximate doubling of existing budgeted levels. With treatment, the unit cost is approximately **$860/AF**, an amount that is still relatively modest in comparison to current "All-In" Water Authority treated water rate of approximately **$1,700/AF**.

We'll have more on treated water rates, and more on the overall balance-scale comparison, later in the document. Stay tuned.

2.3. Opportunities to reduce the District's share of local water 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[1] to 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.

[1] 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 absolve the District from responsibility for future costs.

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.

If the District retained ownership of the local water system facilities under a Not To Flume option, it would look to recover its ongoing cost obligations through the lease, sale, or exchange of its local water with other entities. Alternatively, it could transfer ownership of facilities to another party as part of a broader sales agreement. These options are explored further in **Section 3**.

2.4. Attachments

The table below summarizes the facility maintenance and replacement assumptions of asset management scenarios A, B, and C, as described in Section 2.1.

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:

- Exchange and transfer opportunities exist, but not necessarily at price points that would significantly advantage the District.
- Revenue potential is constrained by conveyance economics and other factors.
- Opportunities will be confirmed during Fine Screening.

3.1. Exchange and transfer opportunities exist, but their economic gain to the District may not be large.

The study team has begun shopping around the possibility of selling, leasing, transferring, or exchanging the District's local water entitlements with other agencies, noting that such an arrangement could create an economic win-win situation for the parties involved. So far none of the target agencies have been beating down our door to sign on.

Our *preliminary* finding is that transfer arrangements are achievable, but at unit price points unlikely to generate large revenues for the District. Our point of reference for characterizing transfer revenues is the District's unit cost to operate and maintain the local water system (see **Section 2.2**). Ideally, transfer revenues would exceed the District's costs, creating a net revenue stream for the District as compensation for forgoing use of its local water entitlement.

The table below summarizes our preliminary assessment of net unit revenues available from a transfer. Our mid-range expectation is that a transfer would cover the District's local water system costs, with a small net surplus.

Net Transfer Benefits After Local Water System Costs – Planning Scenarios

Scenario	Description	Net Unit Revenue (Loss)
Worst Case	No transfer deal. District remains responsible for local water system costs, less treatment.	**($660/AF)** (Loss; costs exceed revenues)
Low (Pessimistic)	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, but only 50 percent of average yield sold.	**($250/AF)** (Loss; costs exceed revenues)
Mid-Range	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, 75 percent of average yield sold.	**$75/AF** (Net gain)
High (Optimistic)	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, 100 percent of average yield sold.	**$400/AF** (Net gain)

3.2. The appeal of transfers to potential partner agencies is constrained by conveyance economics and other factors.

From the District's perspective, the best option for retaining the cost savings benefits of the local supply and maximizing a revenue stream would entail an exchange with another agency purchasing Water Authority water that is capable of taking physical delivery of the local water. The District would take that Exchange Partner's Water Authority water in lieu of the local water. The Exchange Partner would pay Water Authority treated water price less some negotiated price reduction from the District to make the exchange economically competitive for the other agency. This idealized arrangement is not in the cards, and the unit price revenue available to the District will be much less than full Water Authority rates.

The reasons the revenue streams appear modest arise from several factors, including the following:

- **Conveyance Costs:** Most of the identified transfer opportunities would require new conveyance infrastructure to deliver local water to the prospective partner agency. The capital and operating costs of these facilities offsets some, and in some cases all, of the potential economic advantage of the transfer.

- **Treatment Blend Requirements:** In the case of treated water transfers, the economics are further complicated by the water quality of the local water, which requires blending with Water Authority raw water before treatment at the EVWTP. The result is that conveyance facilities must be sized larger, and that the price advantage of the local water is diluted by the need to blend with Water Authority water. Blending is necessary for control of Disinfection By-Products (DBPs) and for management of taste and odor concerns in the finished drinking water.

- **Settlement Agreement:** The Settlement Agreement, by specifying existing entitlements and receivers of unused waters, minimizes or eliminates the incentives of some of the entities to pay for transferred water. This applies in particular to the Indian Bands, and to a lesser degree to Escondido.

  Additionally, the Settlement Agreement specifies that local water "shall be devoted to the exclusive use and benefit of the Parties pursuant to this Agreement and shall not be used for any other purpose." Hence, it is uncertain that the District would be free to sell its portion of local water to third parties. Nevertheless, for the sake of preparing a thorough analysis, exchange and transfer options with third parties are included in the discussion that follows.

3.3. Based on initial review, the study team proposes to advance the following transfer options to Fine Screening:

Transfer and Exchange Opportunities for Fine-Screening

Exchange Partner	Description	Prospect Summary
Escondido (Raw)	Escondido would increase its use of local water, with no new conveyance facilities required. Escondido's tentative plans for an Advanced Water Treatment project may assist this opportunity by proving high quality blend water to Wohlford.	**Modest to Good.** Escondido could add to its water supply at a price less than Water Authority rates. With treatment plant blend requirements, Escondido's demands are not high enough to utilize all of the District's water, but could likely use at least half. **To be refined during fine screening.**
Rincon Municipal Water District (Treated)	Wheel blended treated water through Escondido transmission system, and construct new pump station for delivery to Rincon ID-1 north zone.	**Uncertain.** Absent the Flume, Rincon might need the described pump station to address treated water aqueduct shutdowns. The same facility could be used for long-term local water transfer from Escondido. **To be refined during fine screening.**
Water Authority (Raw)	Deliver raw water from EVWTP to Hubbard Hill on First Aqueduct. Requires 19,000 ft. 24-inch pipe, pump station, flow regulatory storage, and flow control facility.	**Uncertain.** Facility costs to convey water reduce potential benefits, and concerns about local water quality would need to be addressed. Initial review with the Water Authority generated no interest, but we'll try one more time. **To be refined during fine screening.**
Rainbow Municipal Water District (Raw)	Release Henshaw water to river for eventual withdrawal, treatment, and use by Rainbow. Requires Sustainable Groundwater Management Act or similar groundwater management authority in place to manage water rights. Requires groundwater extraction and treatment facilities, likely including desalting.	**Uncertain.** Resolution of groundwater management and ownership issues would be complex. If desalting required for municipal use, economics would not support significant payment to the District for transferred water. Nevertheless an intriguing prospect. **To be refined during fine screening.**

Alternatives not advancing to fine screening include the following:

Transfer and Exchange Opportunities to be Retired

Exchange Partner	Description	Prospect Summary
Water Authority (Treated)	Similar facilities to above, but requires larger facilities to move blended treated water for delivery to First Aqueduct north of Hubbard Hill.	**Poor.** Facilities are costly, operation would be contrary to Water Authority nitrification control efforts, and the only treated water customers available to serve are Rincon and Vallecitos, both of which have better options below.
Vallecitos Water District (Treated)	Build facilities, including a new PS, to convey treated water from the Escondido distribution system, or directly from the EVWTP, to the VAL2 connection on the First Aqueduct.	**Poor.** Conveyance facilities would be costly, and Vallecitos already has redundant supply sources to address its service reliability needs.
Valley Center Municipal Water District (Treated)	Build facilities, including a new PS, to convey treated water from the Escondido system, or directly from the EVWTP, to the VC service area.	**Poor.** Conveyance facilities would be costly.
Indian Bands (Raw)	Release raw water from the Diversion Dam or the Escondido Canal to Indian Bands, for direct use or groundwater recharge.	**Poor.** 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.

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 Water District, with the District incurring significant annexation and capacity fees.

4.1. The delivery reliability consequences of a Not To Flume option will be largely 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.

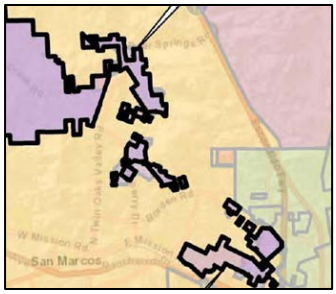
Although the isolation valve project will provide mitigation for scheduled aqueduct shutdowns, it still leaves the District at a disadvantage during rare *unscheduled* outages resulting from aqueduct facility failures and other catastrophic events. In these situations, the District would be reliant on its treated water storage, its access to water from the Oceanside Weese Water Treatment Plant, and its interconnections with Vallecitos Water District (Vallecitos). To supplement these capabilities, the study team recommends the District upsize its planned Pechstein II reservoir by approximately 7.5 million gallons beyond the capacity it would otherwise build, at a cost of approximately $10 million.

Delivery reliability compensation measures are summarized in the table below. The Water Authority isolation valve project is the linchpin of 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 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	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 this year's budget review. **Schedule to be confirmed during fine screening.**
District Treated Water Storage	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 7.5 MG addition to District's planned Pechstein II reservoir.	**Yes.** Include 7.5 MG at cost to District = **$10M.**
Oceanside Weese Water Treatment Plant	The District can access up to 5 mgd by agreement, and likely more in an emergency.	**Yes, as is.** Access expansion beyond existing arrangement unnecessary with above measures.
Interagency Connections	The District has emergency interties in place, the most significant being with Vallecitos.	**Yes, as is.** 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 connection to the raw water pipeline in the Second Aqueduct. Reliability benefits beyond above measures would be minimal, as the same catastrophic events causing outages of the treated water pipelines would also be likely to affect the raw water pipeline.	**No.** Project costs appear unwarranted assuming above measures in place. To be confirmed during fine screening.

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
Low (Optimistic)	Vallecitos waives capacity and annexation fees, but District and Vallecitos split infrastructure transfer fees.	**$6M**
Mid-Range	Vallecitos and District split annexation, capacity, and infrastructure fees.	**$17M**
High (Pessimistic)	District pays full annexation, capacity, and infrastructure fees	**$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. The study team will review this further during fine-screening.

4.3. The Not To Flume option would cause modest changes to District pumping operations and facility needs, resulting in modest cost offsets.

These modest costs and cost offsets will be evaluated during fine screening.

5. Flume Replacement Options (Box 1)

Summary:

- Achieving a long-term Flume rehabilitation or replacement will be an even larger and more expensive endeavor than previously thought. This is because:
    - Many of the bench sections cannot be economically rehabilitated or replaced in the existing easement. Significant new reaches of bypass pipeline will be required.
    - 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.
- A Hybrid alignment option, retaining portions of the existing facilities and alignment, appears the least costly. An All-New option, entailing an entirely new pipeline in a new alignment, appears more expensive, but has advantages that merit the additional investment.

5.1. This is going to be expensive.

We wish we could report otherwise, but achieving a long-term Flume rehabilitation or replacement will be an even larger and more expensive endeavor than previously thought.

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 project 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 scrapped**. We explain why in the subsections below.

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 2019. Roof sections are separating from the sidewalls, floor sections are being undercut by erosion,

inspectors no longer walk on many of the roof sections for fear of falling in, 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 and condition assessment experts, and with 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. Many 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	Adequate access for replace-in-place with buried pipe. Some tight bends and slope conditions. There is a viable bypass route nearby for consideration.	**Use**
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	9,325		31 percent of total bench length	
-- Bypass	20,945		69 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 replace, 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 a magnetic flux leakage 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

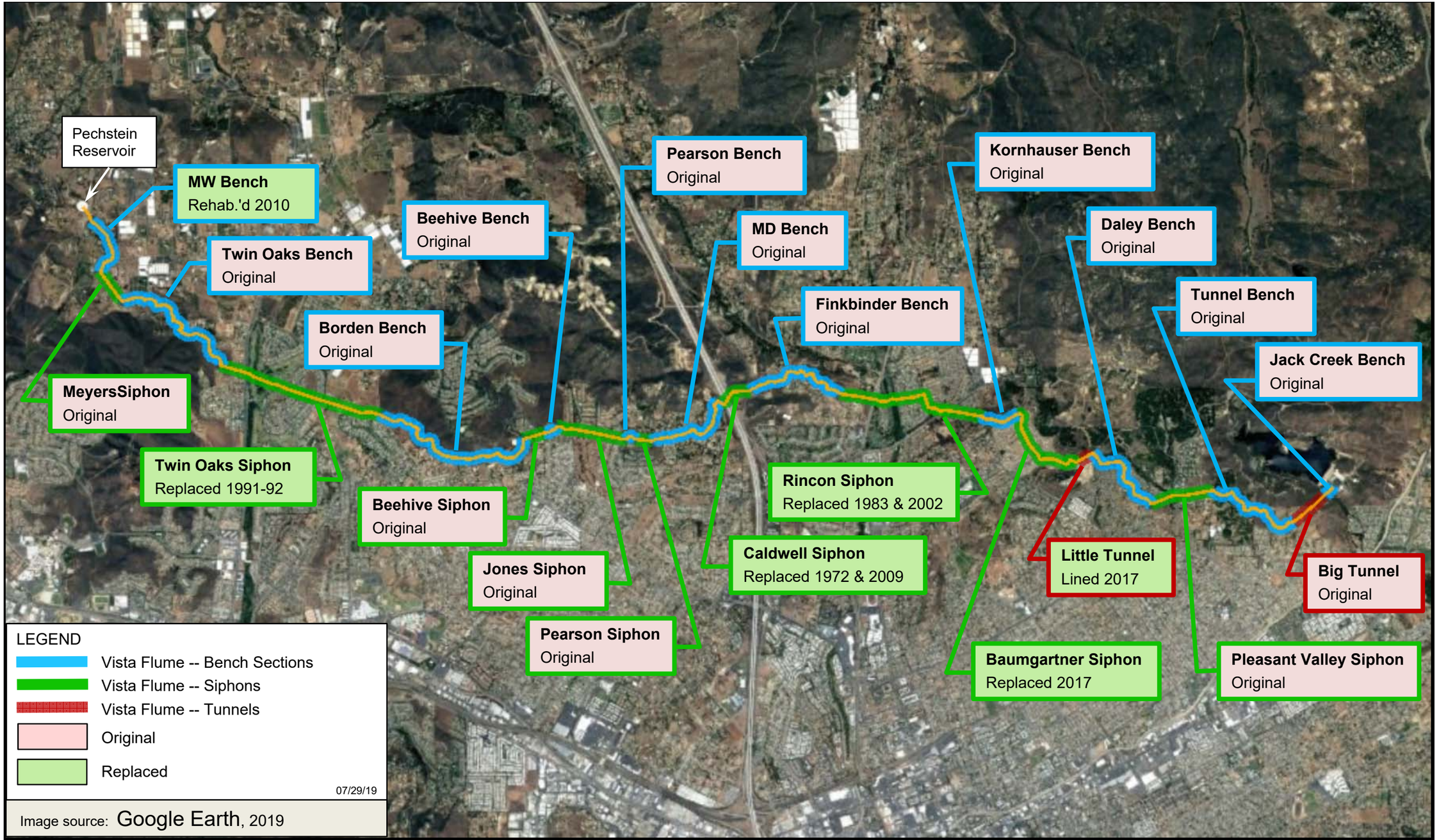


Figure 1

Water Supply Planning Study 2019

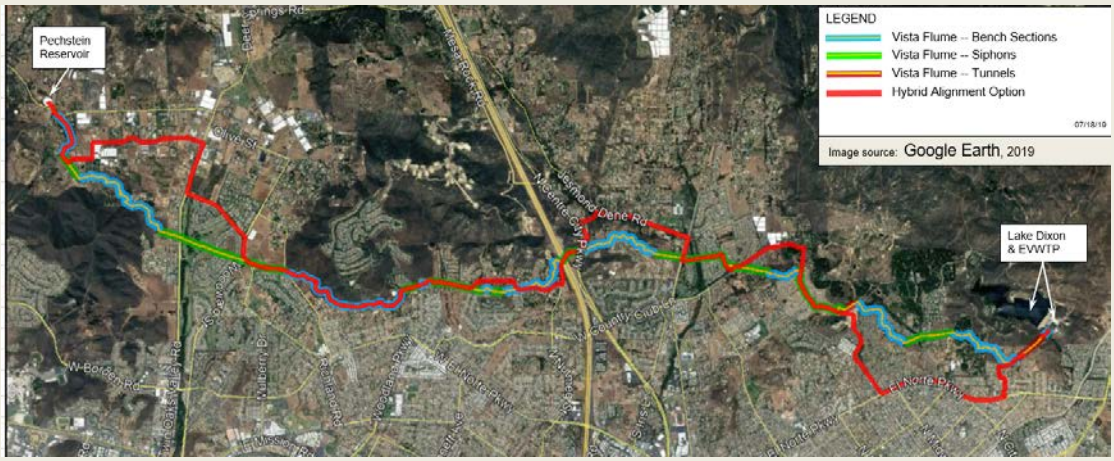
VISTA FLUME BENCH, SIPHON, AND TUNNEL REACHES

VISTA IRRIGATION DISTRICT

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

5.5. The least-cost replacement option follows a Hybrid alignment, retaining portions but not all of the existing Flume alignment.

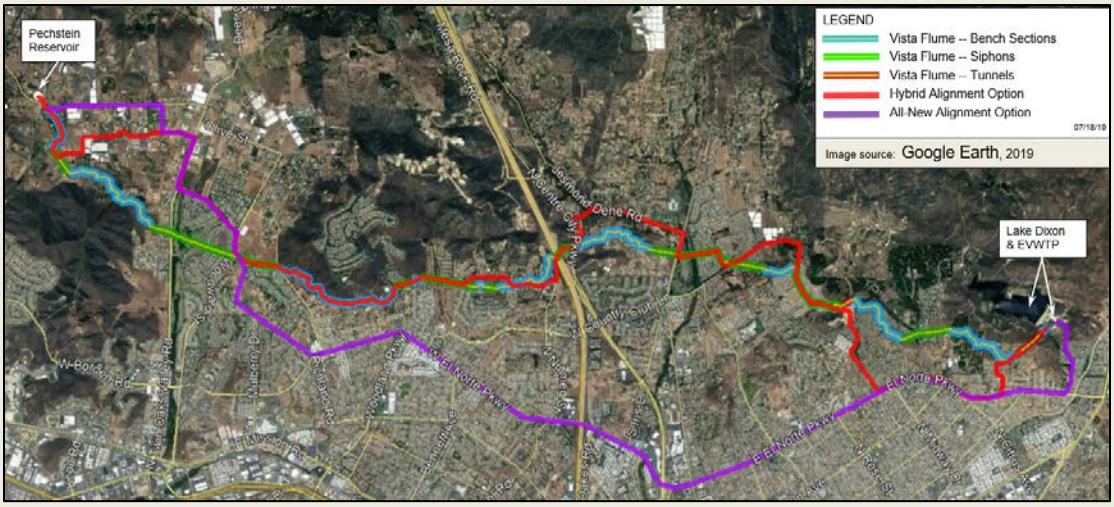
As reviewed above, project costs and other factors favor bypassing many reaches of the existing Flume alignment. The result is a Hybrid alignment combining segments of new and existing alignment reaches, as illustrated, conceptually, in red in the figure below, and in **Figure 2** on the next page. At the coarse-screening level of review, the exact alignment of each bypass section remains conceptual.



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

5.6. Another option entailing an All-New pipeline is more expensive, but may offer advantages that merit the additional investment.

The logical bookend of the range of alignment alternatives is an All-New alignment option such as illustrated, conceptually, 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.

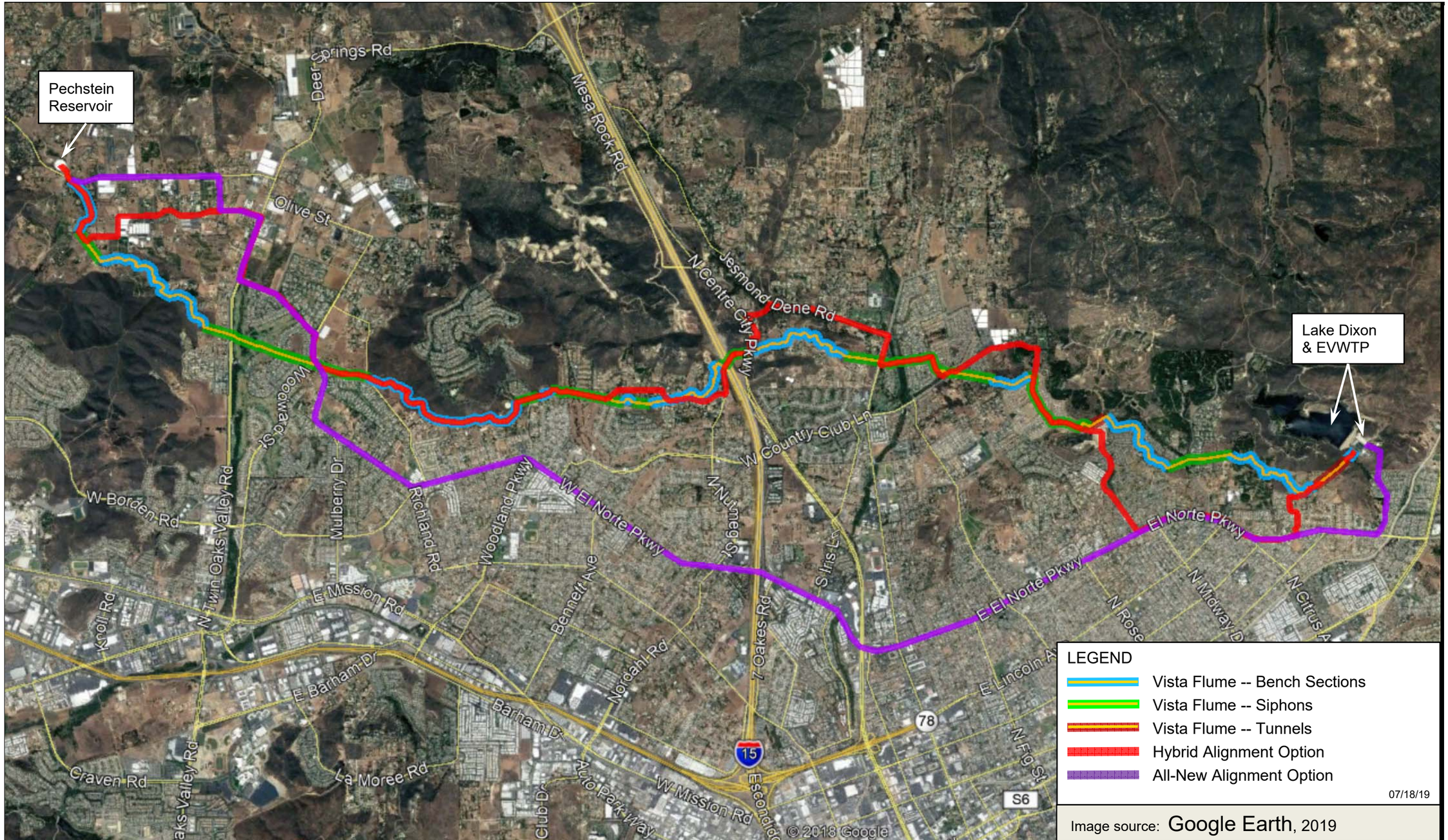


Figure 2	Water Supply Planning Study 2019	VISTA IRRIGATION DISTRICT
	VISTA FLUME REPLACEMENT ALIGNMENT ALTERNATIVES	GILLINGHAM WATER Gillingham Water Planning and Engineering, Inc.

Such an All-New alignment alternative would cost more than a Hybrid alignment, but this cost premium is moderated by easier construction conditions.

5.7. 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. This capacity would provide for adequate delivery capacity and flexibility consistent with the District's current and future demands. 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.

Pipeline Sizing and Delivery Capacity

Pipeline Internal Diameter	Capacity [1]		Discussion
	Hybrid (64,400 ft.)	**All-New** (58,300 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. To be evaluated further during fine screening.
Mid-Range – 36-in.	23 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.	34 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 11.5 ft. minor losses and flow control = 130 ft.) The resulting energy slope = 2.02 ft./1,000 ft. for the Hybrid alignment, and 2.23 ft./1,000 ft. for the All-New alignment.

5.8. Our preliminary cost estimates give pause. We will conduct additional review and refinement of these during Fine Screening.

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 Hybrid and All-New 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 is inclusive of all construction contingencies including miscellaneous appurtenances, utility relocations, traffic control, trenching, and other conditions that would expected to be encountered on a Flume replacement project.

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. Although there is no guarantee, it appears more likely that the bidding climate at that time would be lower rather than higher.

The estimates are preliminary, based not on detailed construction drawings but rather on professional judgement of the construction conditions and methods applicable to each reach of the alignment as depicted in Figure 1. The estimates are Class 5 level estimates, having an accuracy range of approximately -35 to +50 percent.

The estimates are for welded steel pipe. PVC and other alternative materials could be constructed at lower costs, but would not provide the same durability of welded steel. We will explore alternative pipe materials further during fine screening.

Preliminary Concept-Level Capital Cost Estimates

Cost Item	Hybrid ($2019) (millions)	All-New ($2019) (millions)
New Pipeline	$ 68	$ 77
Siphon Structural Relining	$ 10	--
Bench Demolition and Siphon Abandonment	$ 7	$ 8
Subtotal – Construction Costs	**$ 85**	**$ 85**
Design / Administration / Permitting / ROW @ 35%	$ 30	$ 30
Total Project Cost (Rounded)	**$115**	**$115**

5.9. We recommend both alignment alternatives be advanced to fine screening.

Project costs for the two alternatives are close enough that we recommend both be advanced to fine screening for further evaluation. In addition to costs, evaluation criteria differences between two alternatives include the following:

- **Pressurization / Water Quality Protection and Security:** 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 into the water. The study team believes pressurization is a preferred component of a Flume replacement project. This factor favors the All-New alignment, as it provides full pressurization of the Flume. 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 from the system. 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.

For a Flume replacement project, the study team anticipates project design issues, inclusive of pressurization, will be subject to review and approval by DDW. DDW has discretion to disallow an unpressurized design if they find the design would unnecessarily jeopardize public health. The study team will meet with DDW to explore these issues during fine screening.

- **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 over the Hybrid alternative. We'll tease these factors out a bit more during fine screening.

- **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. We will refine the scheduling of capital outlay costs further during fine screening.

6. Conclusions

6.1. Cost Review: The comparison is almost level, but uncertainties remain and will require additional review and refinement.

Preliminary costs of the Not To Flume and To Flume options are summarized in the tables below.

Major Cost Components for Not To Flume Option

Cost Component	Description	Equivalent Unit Cost ($2019)
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 1.2.**	$1,700/AF
Exchange Benefit (Net of Local System Costs)	Local water exchanged with willing purchasers, at the mid-range price point described in **Section 3.1.** The benefit is the net after coverage of local water system costs.	($75/AF) (benefit)
Delivery Reliability	To compensate for reduction in delivery reliability absent the Flume, increase storage of planned Pechstein II reservoir by 7.5 MG, at a capital cost of $10M, as described in **Section 4.1.** The capital cost is amortized at 3.5 percent over 40 years (A/P = .0468), and converted to unit cost using the 5,000 AF/yr average annual yield of the local water system.	$90/AF
Boot and Bennett Transfer to Vallecitos	Transfer Boot and Bennett areas to Vallecitos, incurring a mid-range capital cost of $17M as presented in **Section 4.2.** Capital outlay costs are amortized and converted to unit costs as above.	$140/AF
TOTALS	(Rounded)	**$1,900/AF**

Major Cost Components for To Flume Option

Cost Component	Description	Equivalent Unit Cost ($2019)
Local Water System Long-Term O&M	Operate and maintain (O&M) the local water system on a long-term, asset management driven investment basis as described in **Section 2.** Costs are the mid-range estimate presented.	$860/AF
Flume Replacement	Replace the flume at a total capital cost of $115 million as described in **Section 5.** The capital cost is amortized at 3.5 percent over 40 years (A/P = .0468), and converted to unit cost using the 5,000 AF/yr average annual yield of the local water system.	$1,080/AF
Self-Treatment Benefit	Operation of the flume results in the District utilizing 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)	**$1,800/AF**

6.2. Review of Non-Cost Factors: To Flume provides a degree of insulation from imported water rate and supply uncertainties, and an increment of better service reliability, but requires major capital investment.

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 refinement during fine screening.

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. Finally, the To Flume option allows the District to maintain a degree of insolation from the rate and supply uncertainties of imported water, whereas the Not To Flume option does not.		
Intrinsic Values	For board discussion	?	?

6.3. We'll review implications of these preliminary findings further at the upcoming board workshop.

To our eyes the balance scale at the end of coarse screening is level. We'll review our assessment with you at the Board workshop, and look forward to much interesting discussion.

Thanks for making it to this point. We have much to do during fine screening.

VISTA IRRIGATION DISTRICT

Water Supply Planning Study

Workshop No. 2 – Coarse Screening

August 8, 2019

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

Brown AND Caldwell

Ken Weinberg Water Resources Consulting

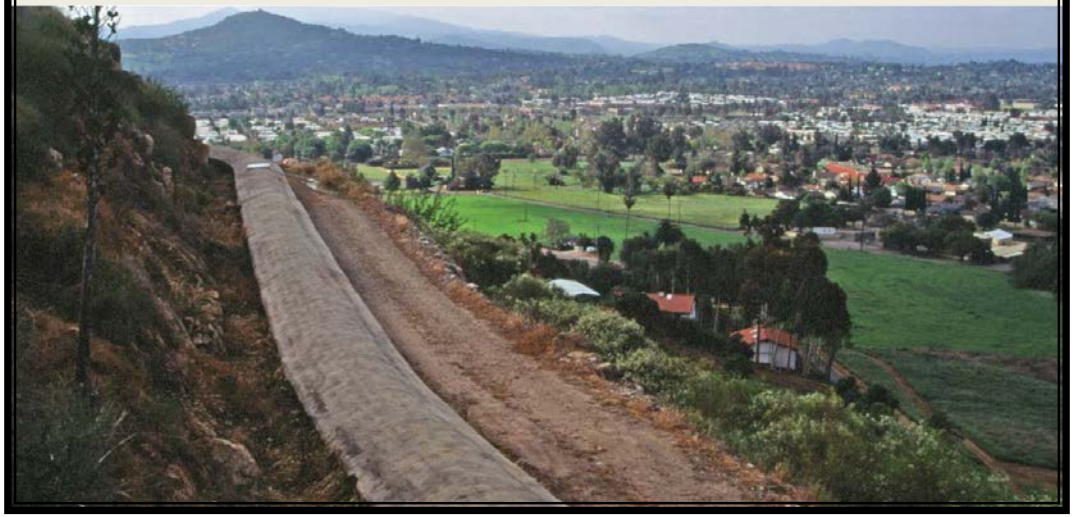
DLM ENGINEERING, INC

Richard Haberman, P.E.
Consulting Engineer

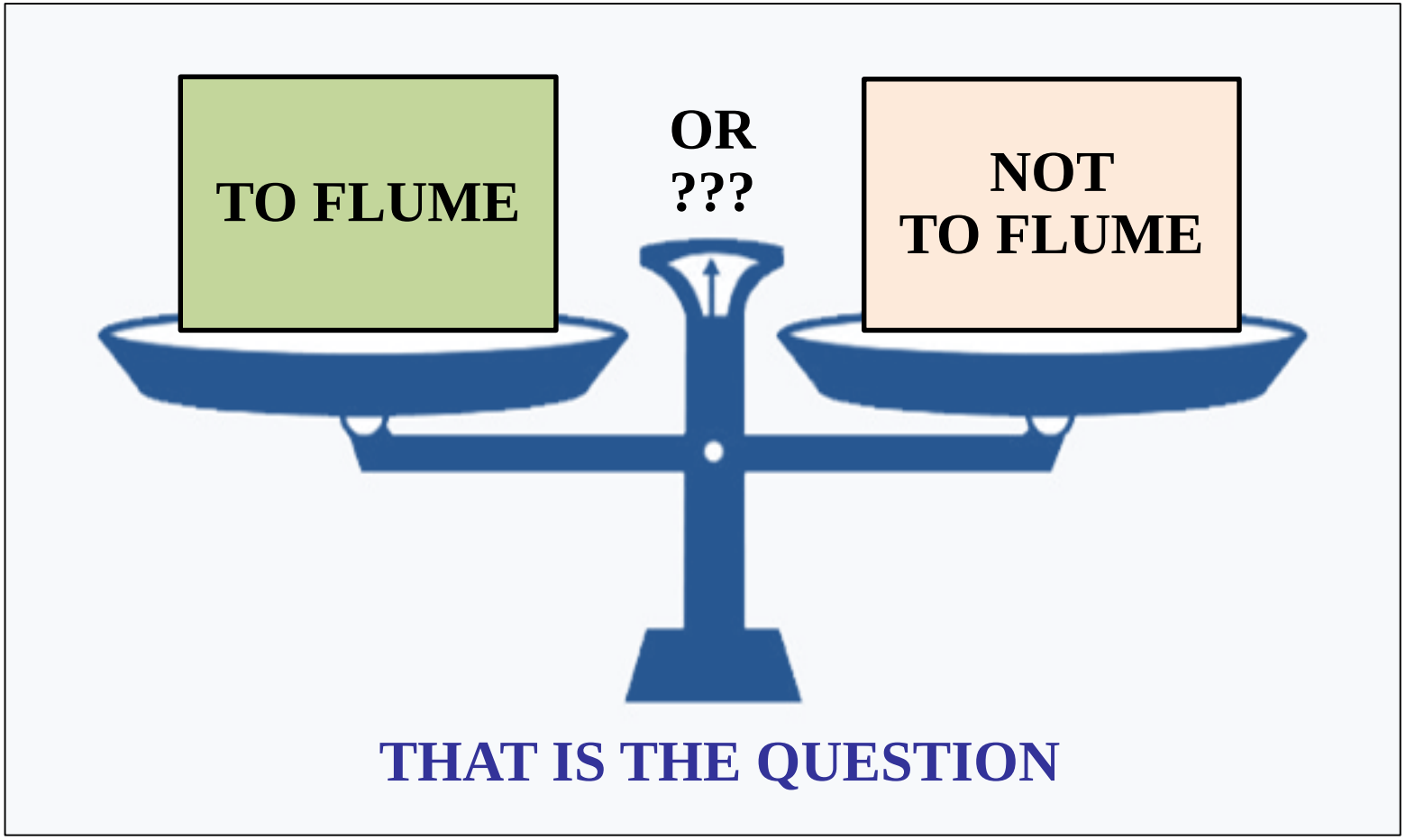
HDR

THE VISTA FLUME

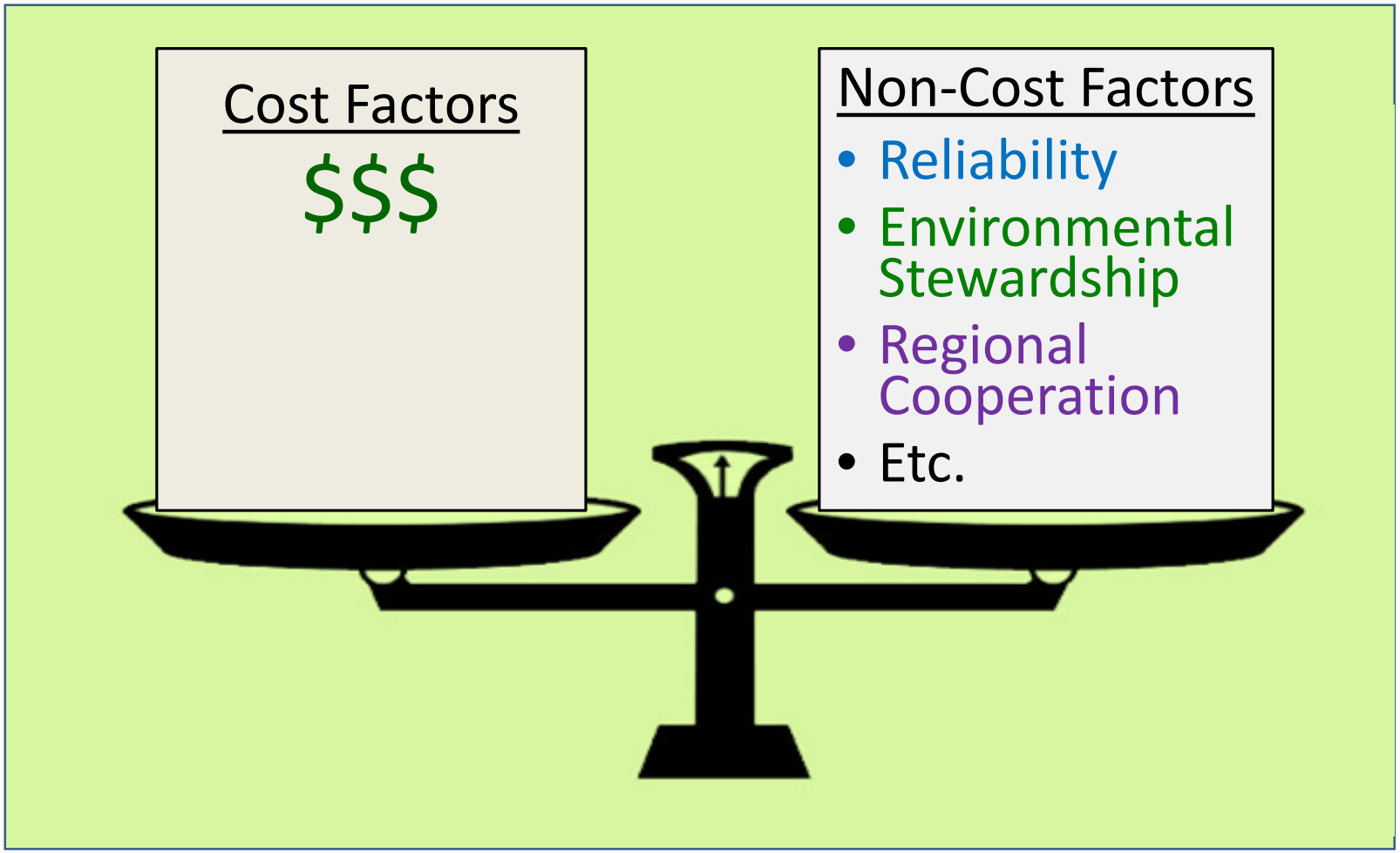
PROVIDING RELIABLE WATER SERVICE SINCE 1926



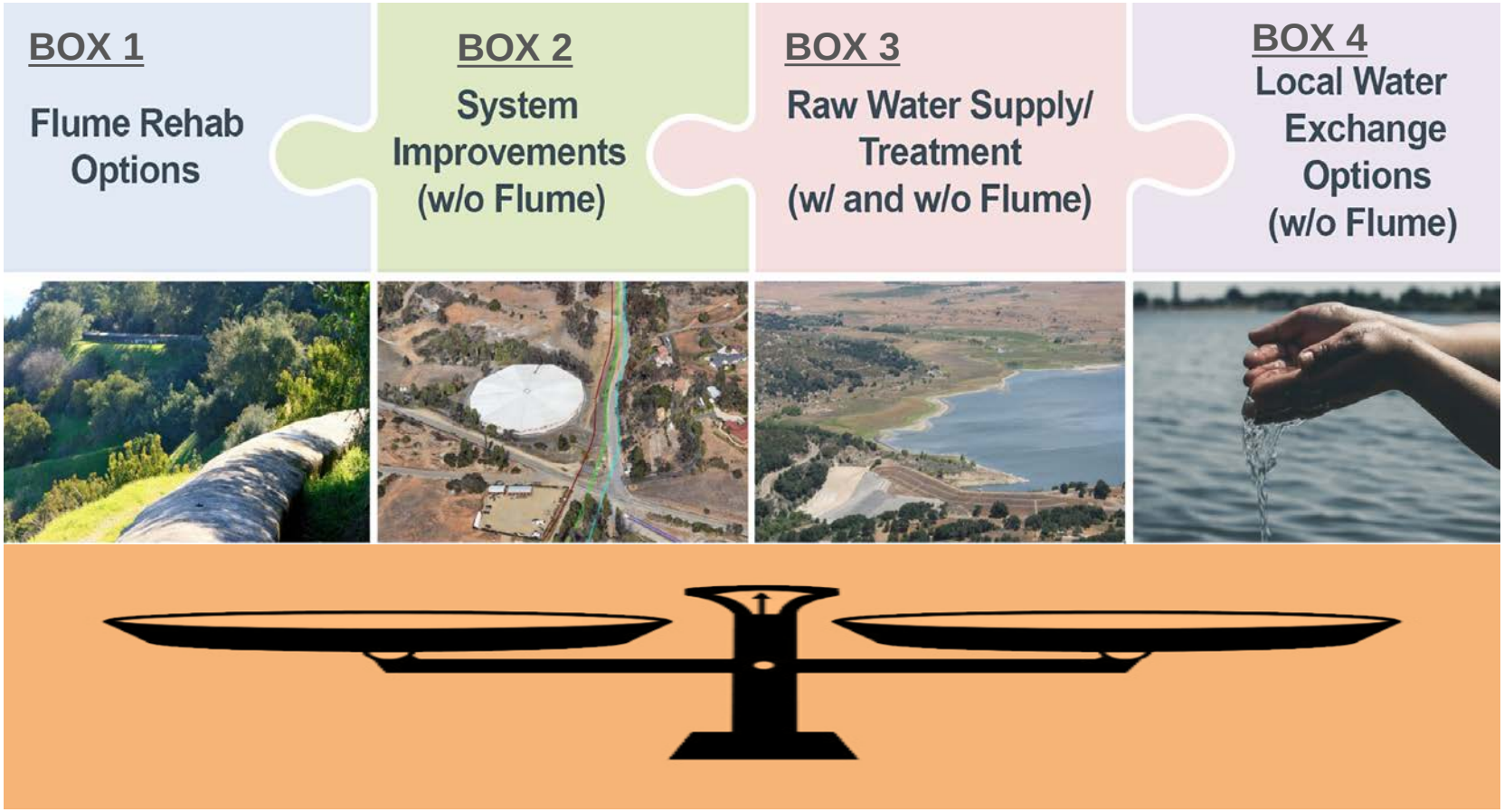
At the coarse-screening level of review, the balance scale remains even



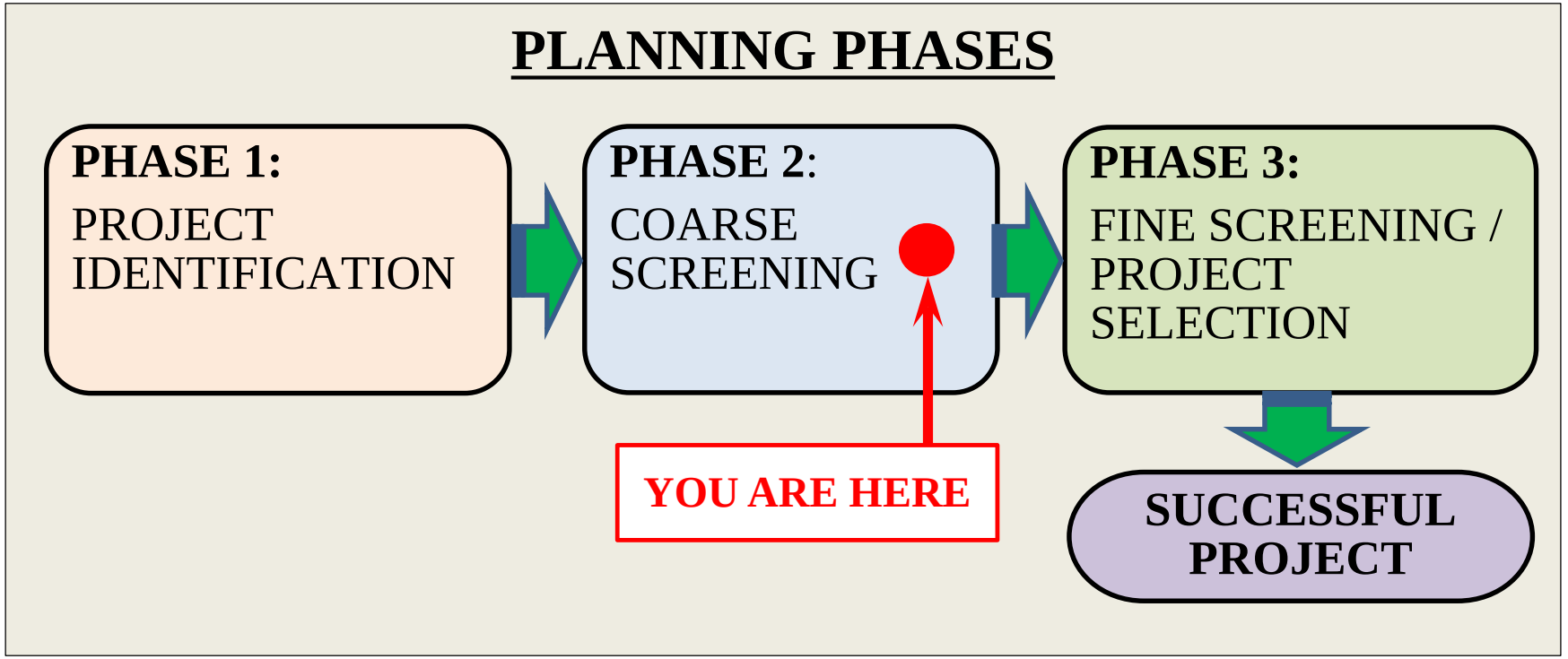
Considering both cost and non-cost factors . . .



. . . and weighing the influence of the several categories of study issues

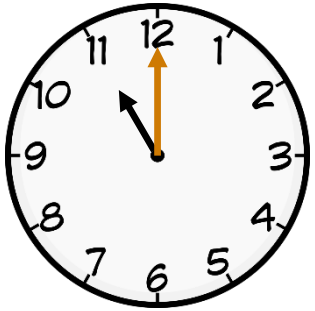


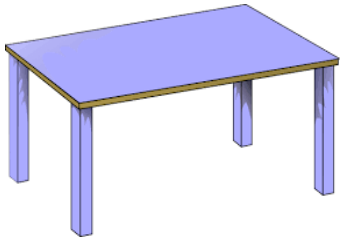
Study Process: Three Phases



AGENDA

1) INTRODUCTION
2) COARSE SCREENING FINDINGS
3) SENSITIVITY ANALYSIS / ISSUES FOR REFINEMENT
4) NEXT STEPS / SCHEDULE
5) ADJOURN





COARSE 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)

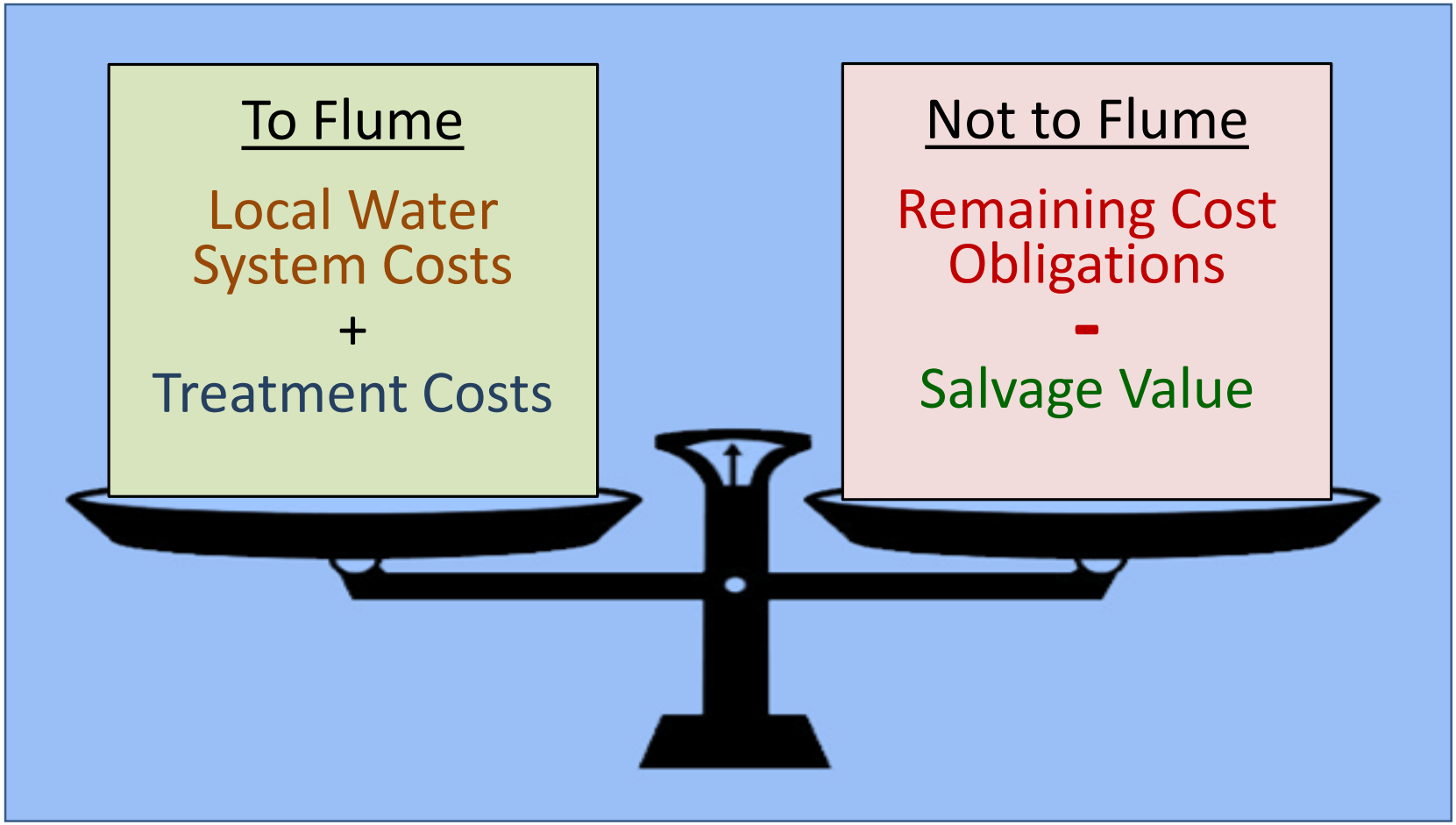
BOX 4

Local Water Exchange Options (w/o Flume)

Box 3:
Local Water System and Treatment

Don MacFarlane, P.E. – DLM Engineering

Box 3 Issues: Cost Considerations



Local Water System Costs: What Are the Costs to Operate the Local System?

How Much Can Costs be Reduced for Not to Flume?

Local Water System Costs: Asset Management Approach to Budgeting

Annual Operation, Maintenance, Repair, and Replacement Costs

Scenario	Well + Ditches	Henshaw Dam	Escondido Canal	SP Under-grounding	Bear Valley	Other Budget	Total
Existing Budget	$554,000	$214,000	$375,000	$20,000	Included in Esc. Canal	$459,000	**$1.6M**
A) Low	$925,000	$214,000	$435,000	$766,000	$342,000	$459,000	**$3.1M**
B) Middle	$986,000	$362,000	$455,000	$766,000	$399,000	$459,000	**$3.4M**
C) High	$1,072,000	$706,000	$477,000	$766,000	$479,000	$459,000	**$4.0M**

Increased investment will be needed for long-term sustainability

Local Water System Costs: Are Modest in Comparison to Imported Water, Despite Robust Replacement Assumptions

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
Budget	$1,622,000	5,000	**$320/AF**	$200/AF	**$520/AF**
A) Low	$3,141,000	5,000	**$630/AF**	$200/AF	**$830/AF**
B) Middle	$3,427,000	5,000	**$690/AF**	$200/AF	**$890/AF**
C) High	$3,959,000	5,000	**$790/AF**	$250/AF	**$1,040/AF**

"All In" Water Authority Treated Water Rate = **$1,700/AF**

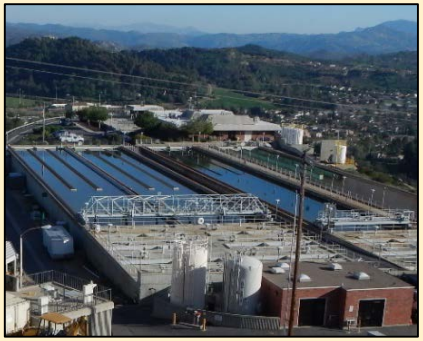
Local Water System Costs: Opportunities to Reduce Costs for Not To Flume are Limited

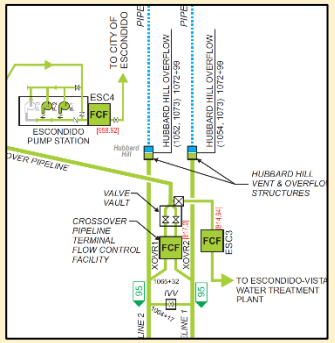
Real Reductions Require Another Party to Assume Ownership

Local Water System Costs: Refinements for Fine Screening

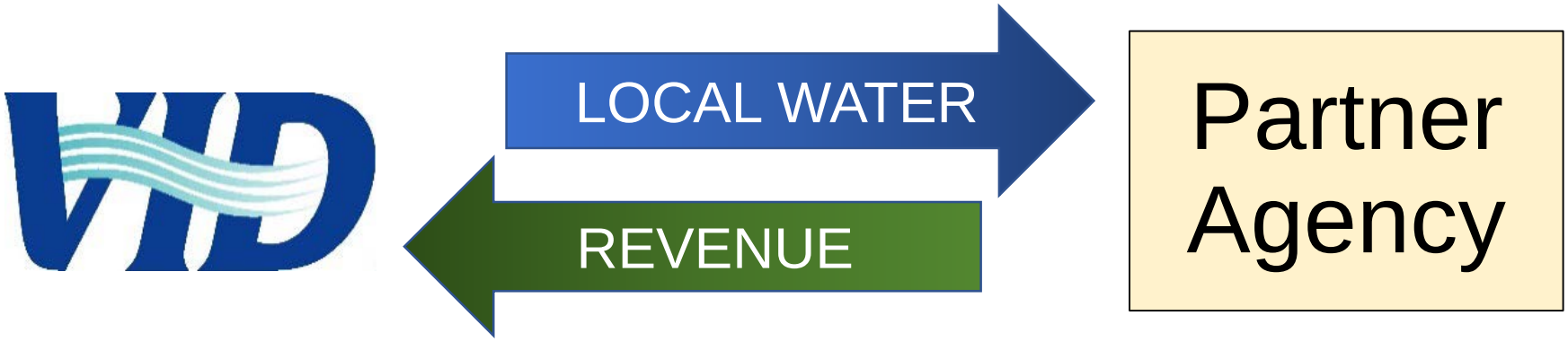
1. Minor refinements and confirmations

Box 4:
Local Water Transfer Options





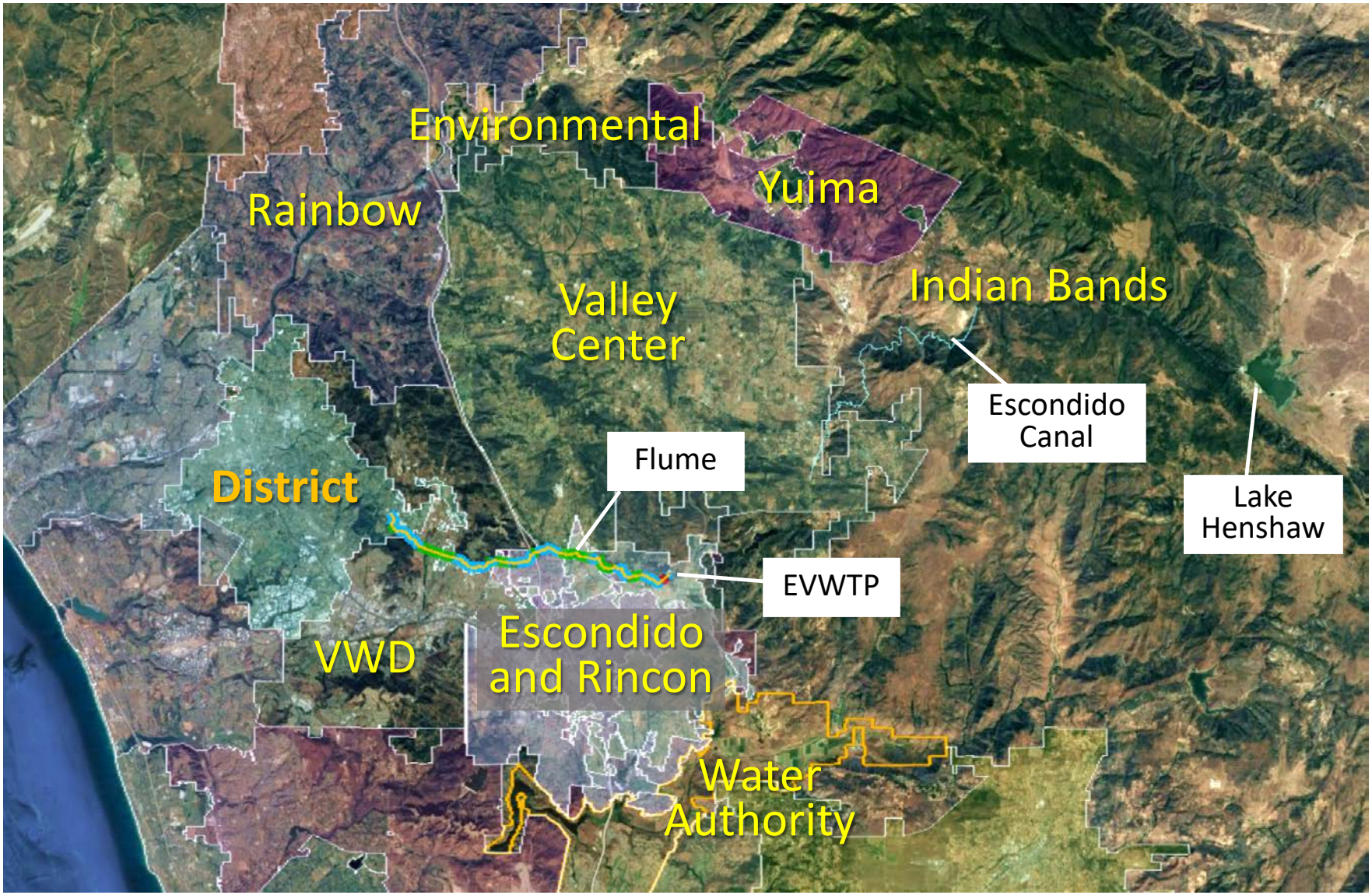
Ken Weinberg – Weinberg Water Resources



- Obtains $ to help offset increased Water Authority purchases

- Saves $ in comparison to Water Authority rates

Box 4 Alternatives: Possible Exchange Partners



Evaluating Exchange Options

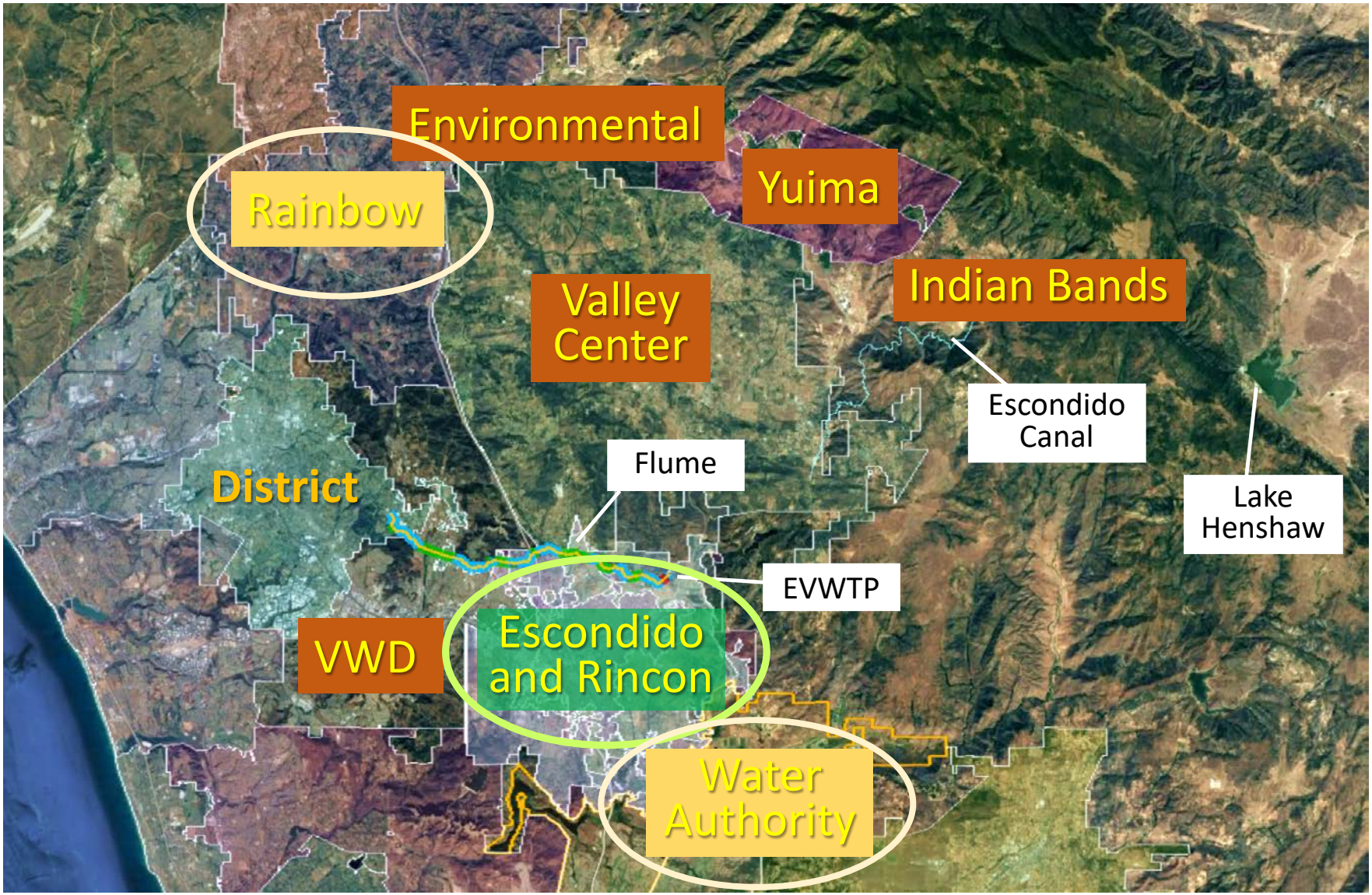
- Requires New Facilities ($)
  - All except Escondido, Environmental
- Facilities must be oversized for blended treated water
  - Rincon, Valley Center, Vallecitos, Water Authority (Treated)
- Demand and Water Quality limits
  - Escondido, Rincon
- No Financial Incentive
  - Indian Bands
- No Revenue Generation
  - Environmental

Economic benefit to District may not be large

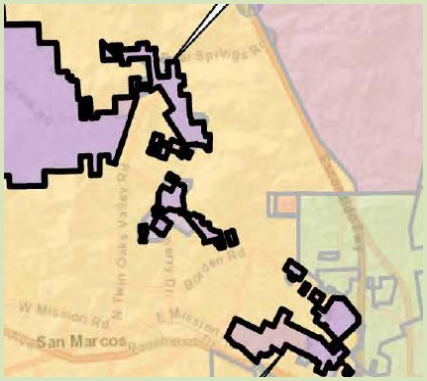
Net Transfer Benefits After Local Water System Costs

Scenario	Description	Net Unit Revenue (Loss)
Worst Case	No transfer deal. District remains responsible for local water system costs, less treatment.	**($660/AF)** (Loss; costs > revenues)
Low (Pessimistic)	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, but only 50 percent of average yield sold.	**($250/AF)** (Loss; costs > revenues)
Mid-Range	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, 75 percent of average yield sold.	**$75/AF** (Net gain)
High (Optimistic)	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, 100 percent of average yield sold.	**$400/AF** (Net gain)

Box 4 Alternatives: Possible Exchange Partners



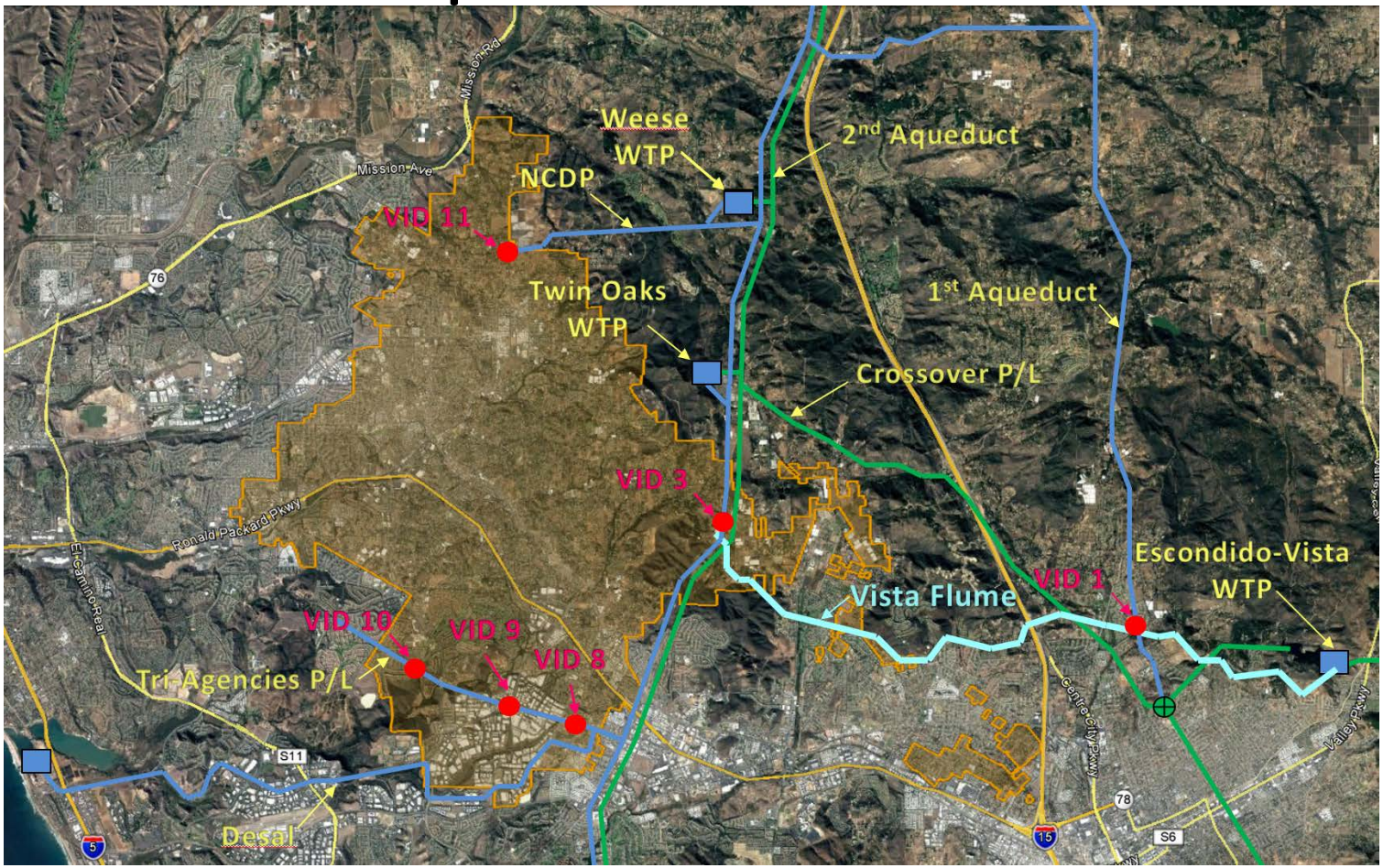
Box 2:
System Improvements (w/o Flume)



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 flume



- Issue is reliability during scheduled 10-day aqueduct shutdowns

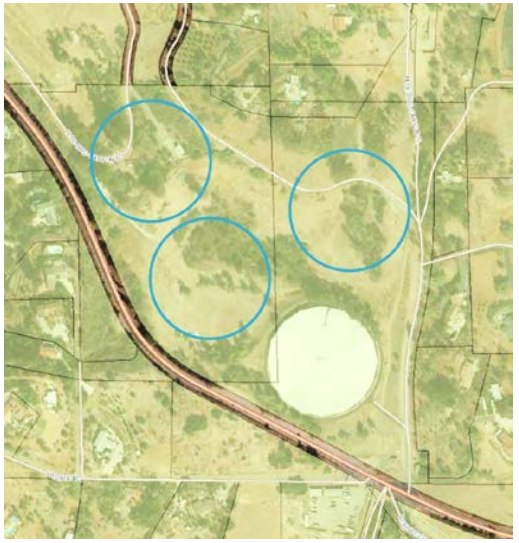
Delivery Reliability:
Recommended portfolio:

SDCWA Isolation Valve Project

Scheduled for FY22-23*

Oceanside and VID Interconnects

Existing, no expansions needed

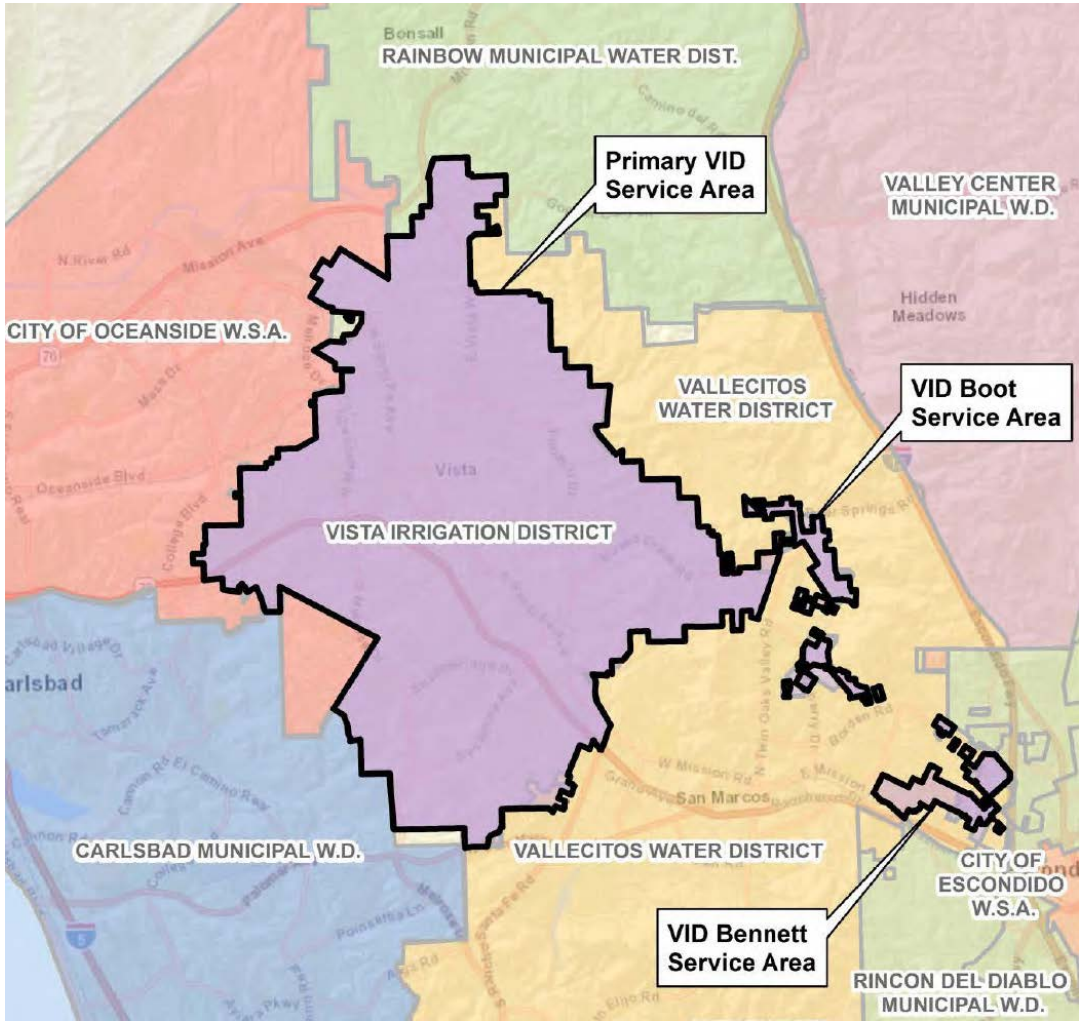


New treated water storage

Enlarge planned Pechstein II Res.; **~$10M**

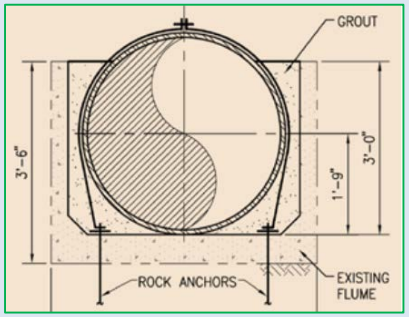
* Previously scheduled for current year; Schedule to be confirmed.

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



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

Box 1:
Flume Rehab / Replacement



Paige Russell, P.E. – Brown and Caldwell

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

Kathy Haynes, P.E. – HDR

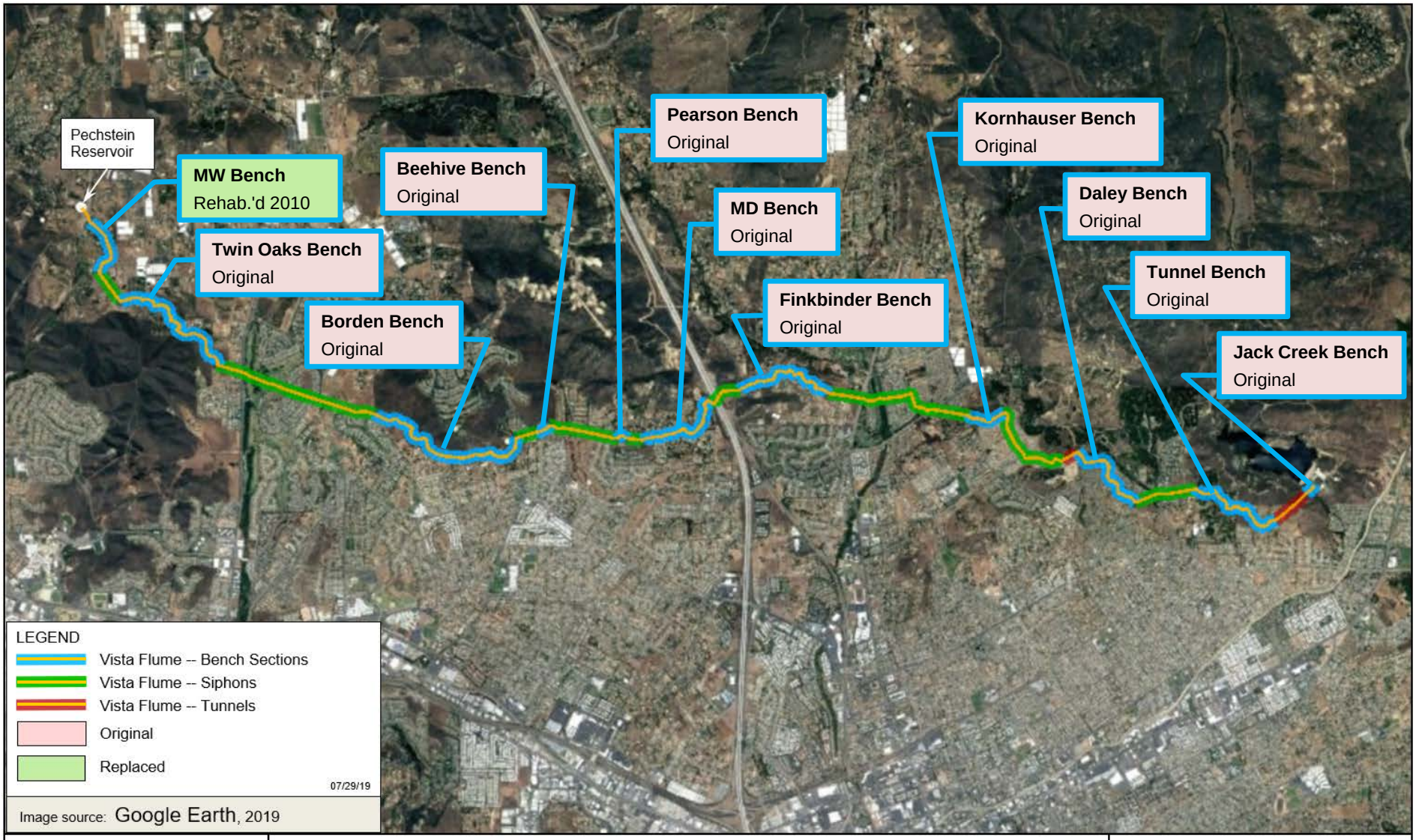


Figure 1

Water Supply Planning Study 2019

VISTA FLUME BENCH, SIPHON, AND TUNNEL REACHES

VISTA IRRIGATION DISTRICT

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

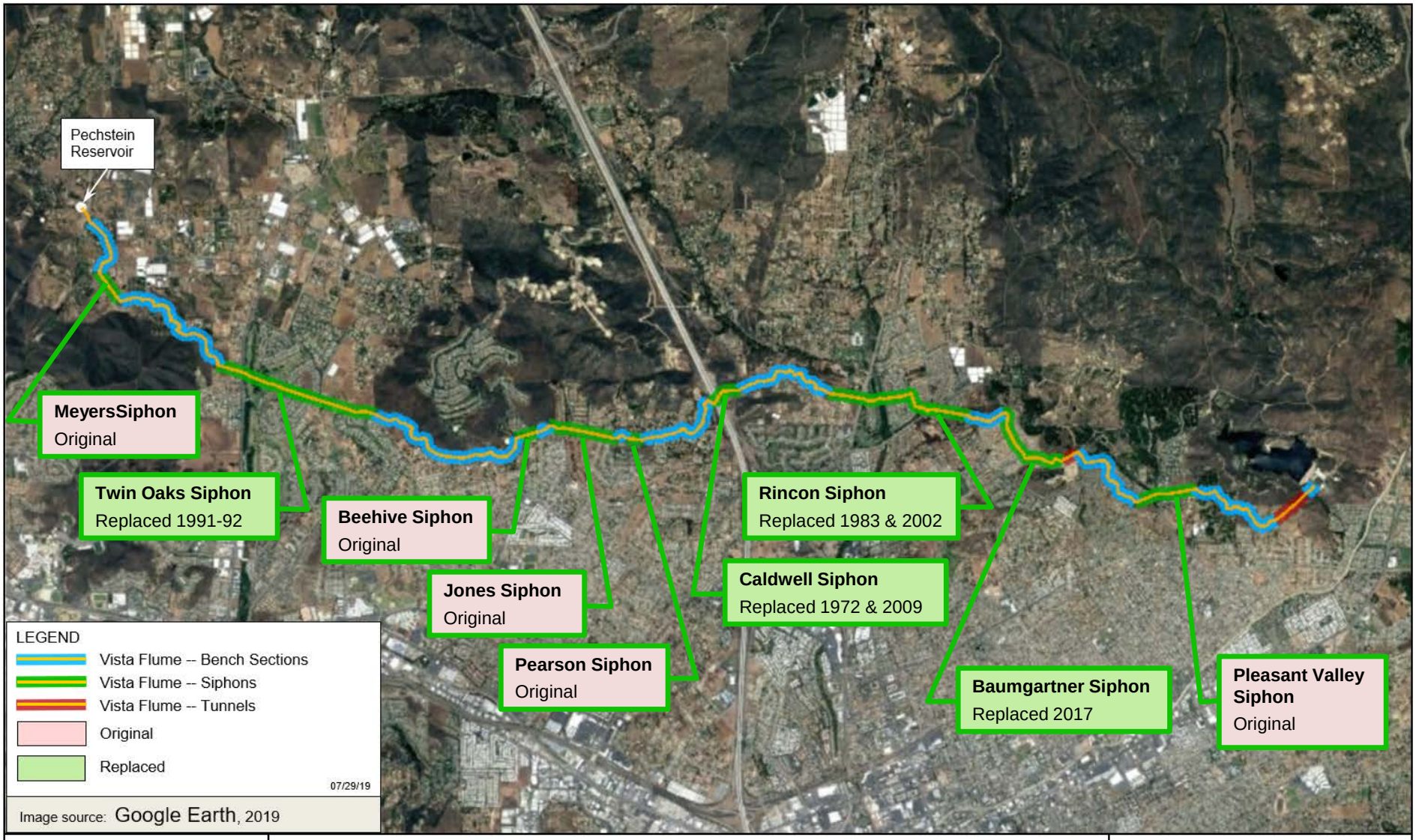


Figure 1

Water Supply Planning Study 2019

VISTA FLUME BENCH, SIPHON, AND TUNNEL REACHES

VISTA IRRIGATION DISTRICT

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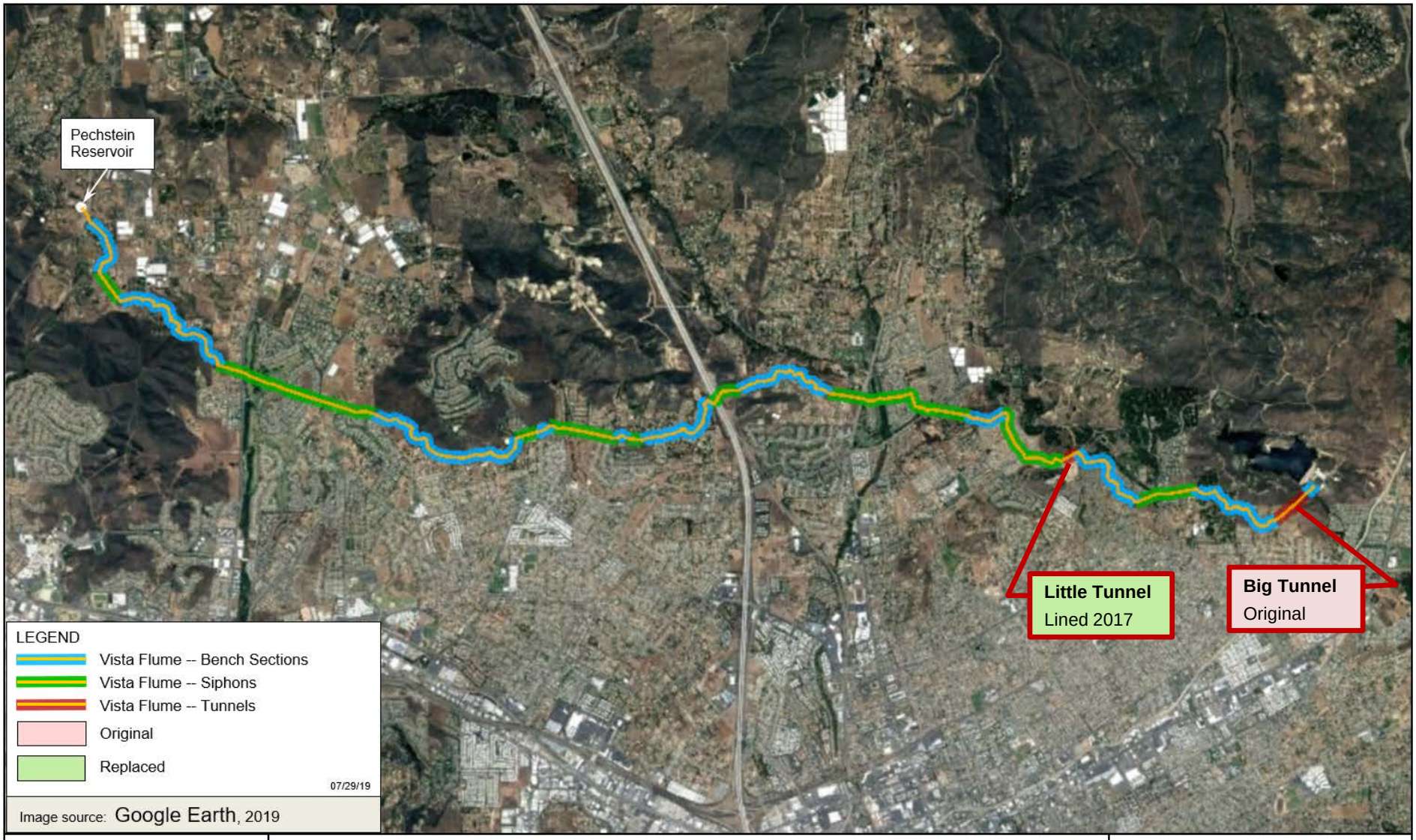

Figure 1

Water Supply Planning Study 2019

VISTA FLUME BENCH, SIPHON, AND TUNNEL REACHES

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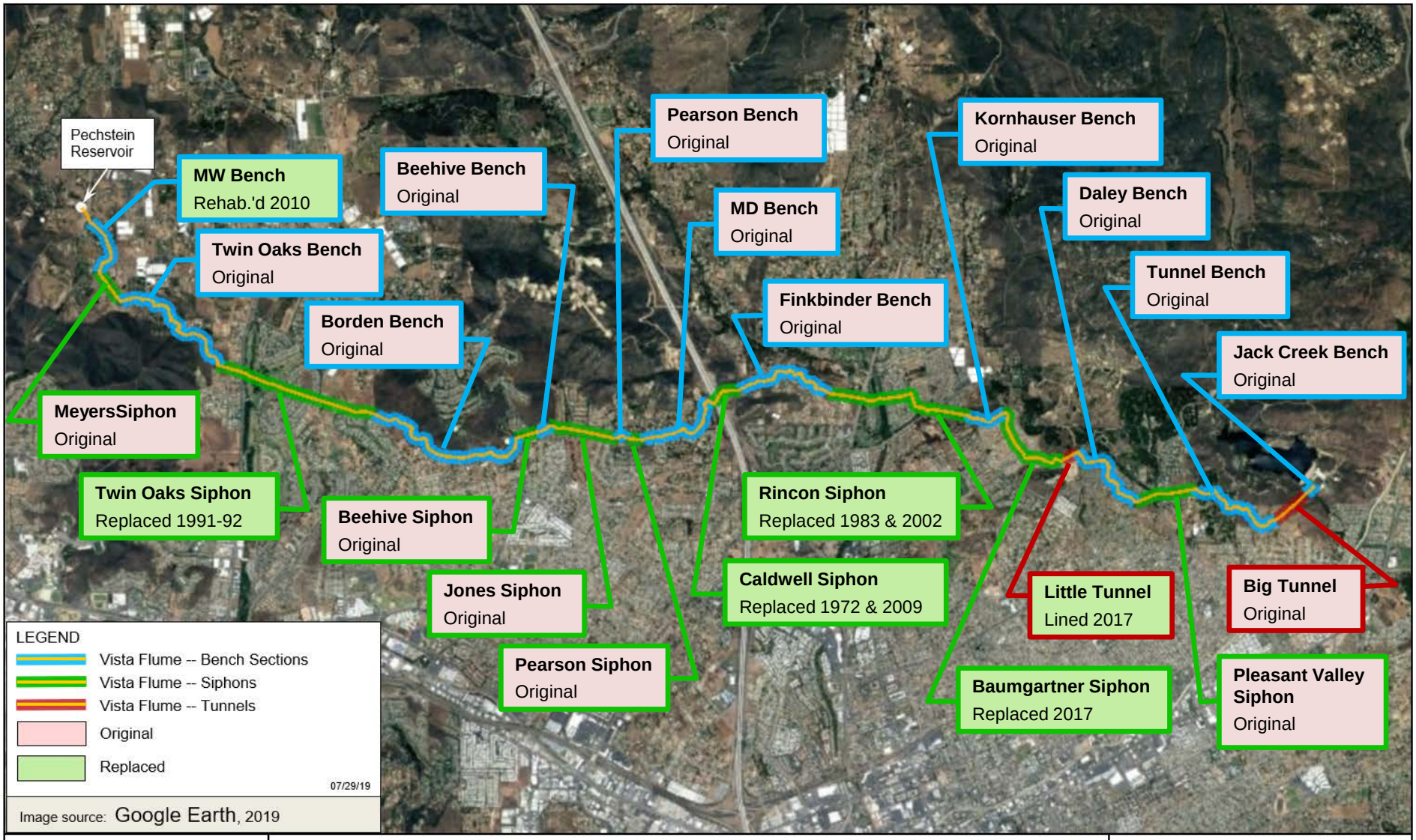


Figure 1

Water Supply Planning Study 2019

VISTA FLUME BENCH, SIPHON, AND TUNNEL REACHES

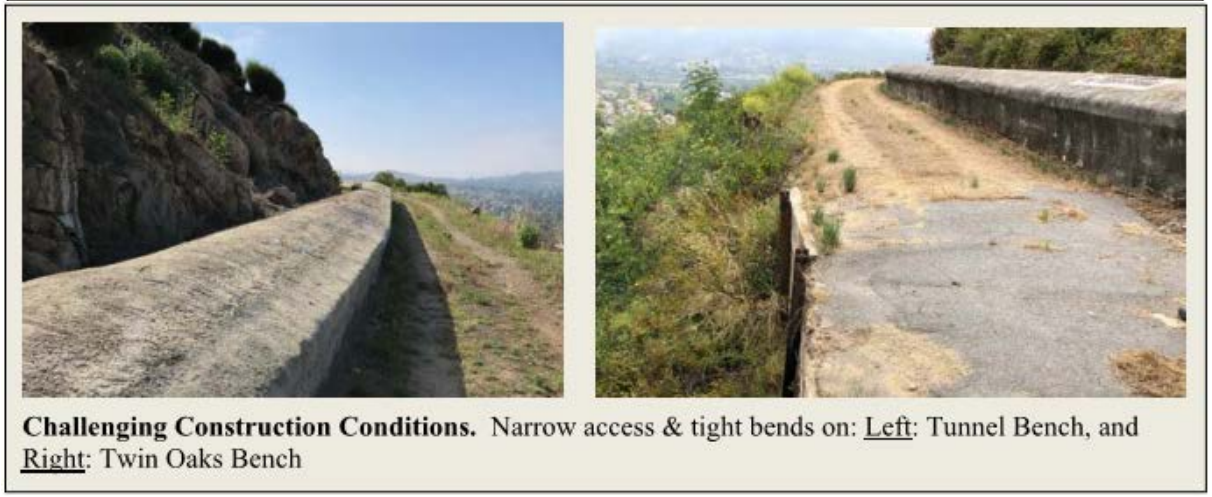
VISTA IRRIGATION DISTRICT

GILLINGHAM WATER
Gillingham Water Planning and Engineering, Inc.

Prior Assumptions Revised

Many benches unsuitable for reuse

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



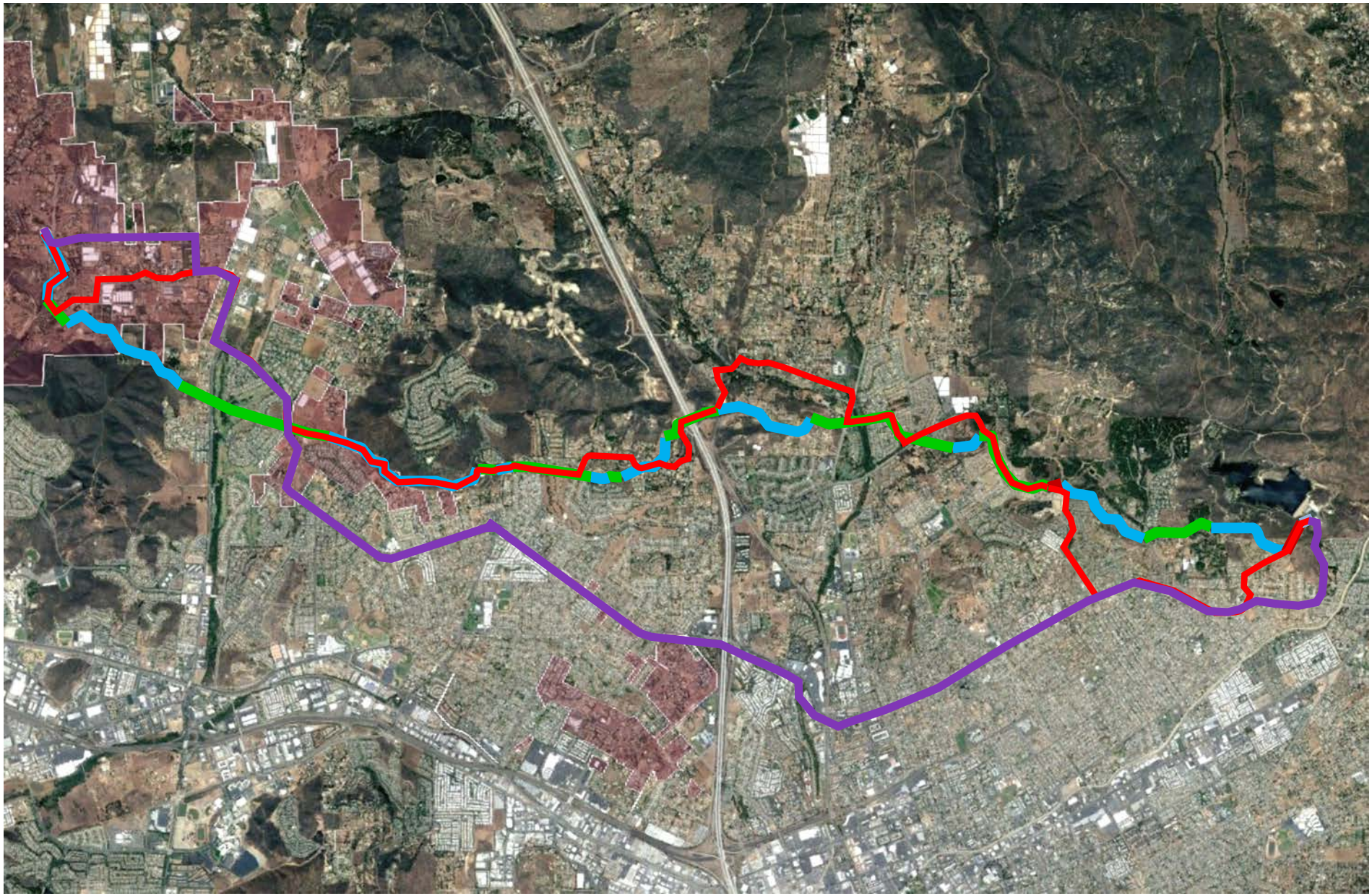
Challenging Construction Conditions. Narrow access & tight bends on: Left: Tunnel Bench, and Right: Twin Oaks Bench

Prior Assumptions Revised

Siphons likely to require structural rehab/replacement

Siphon Asset Management Approach

1. Coarse-Screening has assumed replacement required, per age
2. Condition Assessment work warranted to confirm
3. Fine-Screening will account for PROBABILITY of replacement



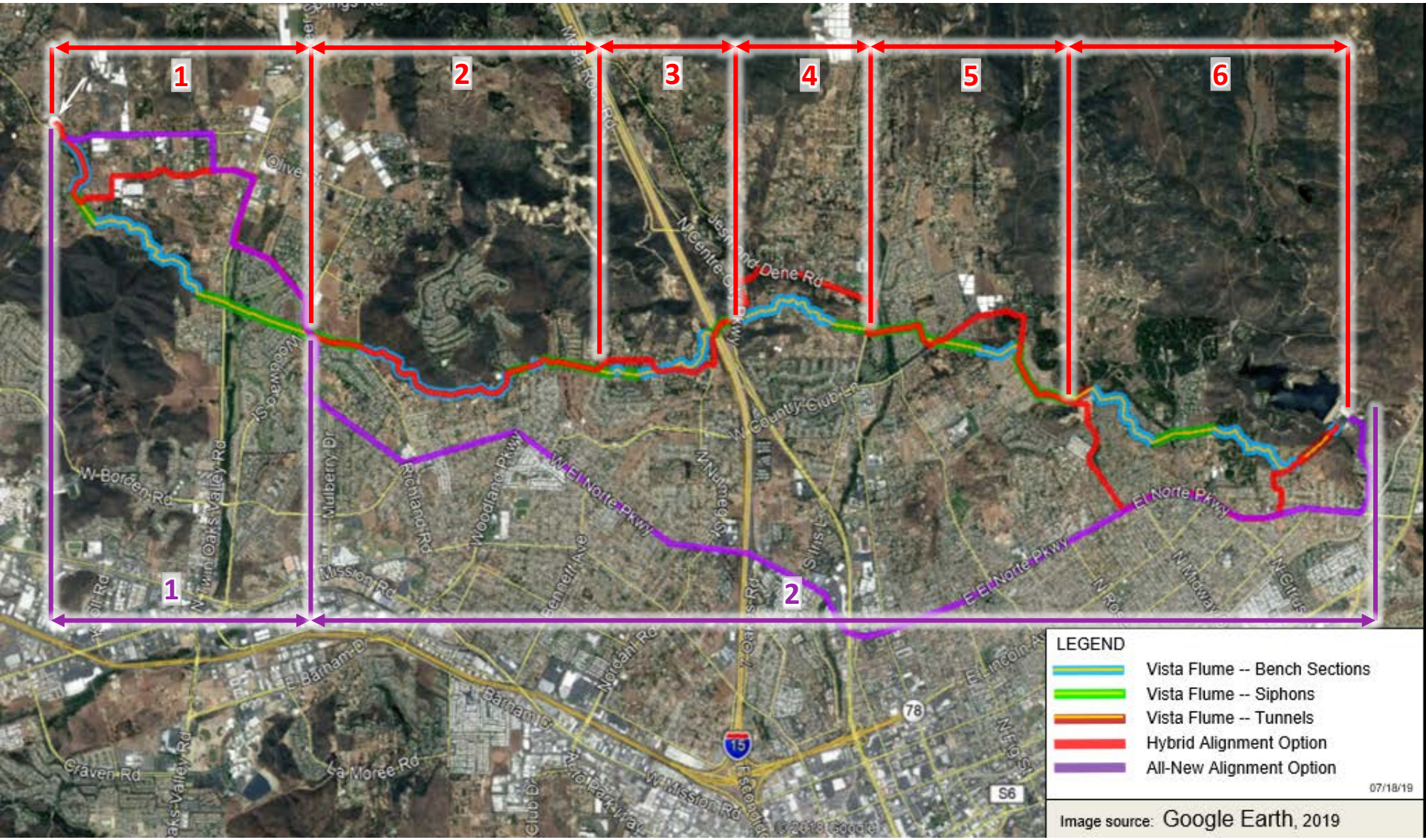
Preliminary Cost Estimates (to be refined)

Cost Item	Hybrid ($2019) (millions)	All-New ($2019) (millions)
New Pipeline	$ 73	$ 77
Siphon Structural Relining	$ 6	--
Bench Demolition and Siphon Abandonment	$ 6	$ 8
Subtotal – Construction Costs	**$ 85**	**$ 85**
Design / Admin. / Permitting / ROW @ 35%	$ 30	$ 30
Total Project Cost (Rounded)	**$115**	**$115**

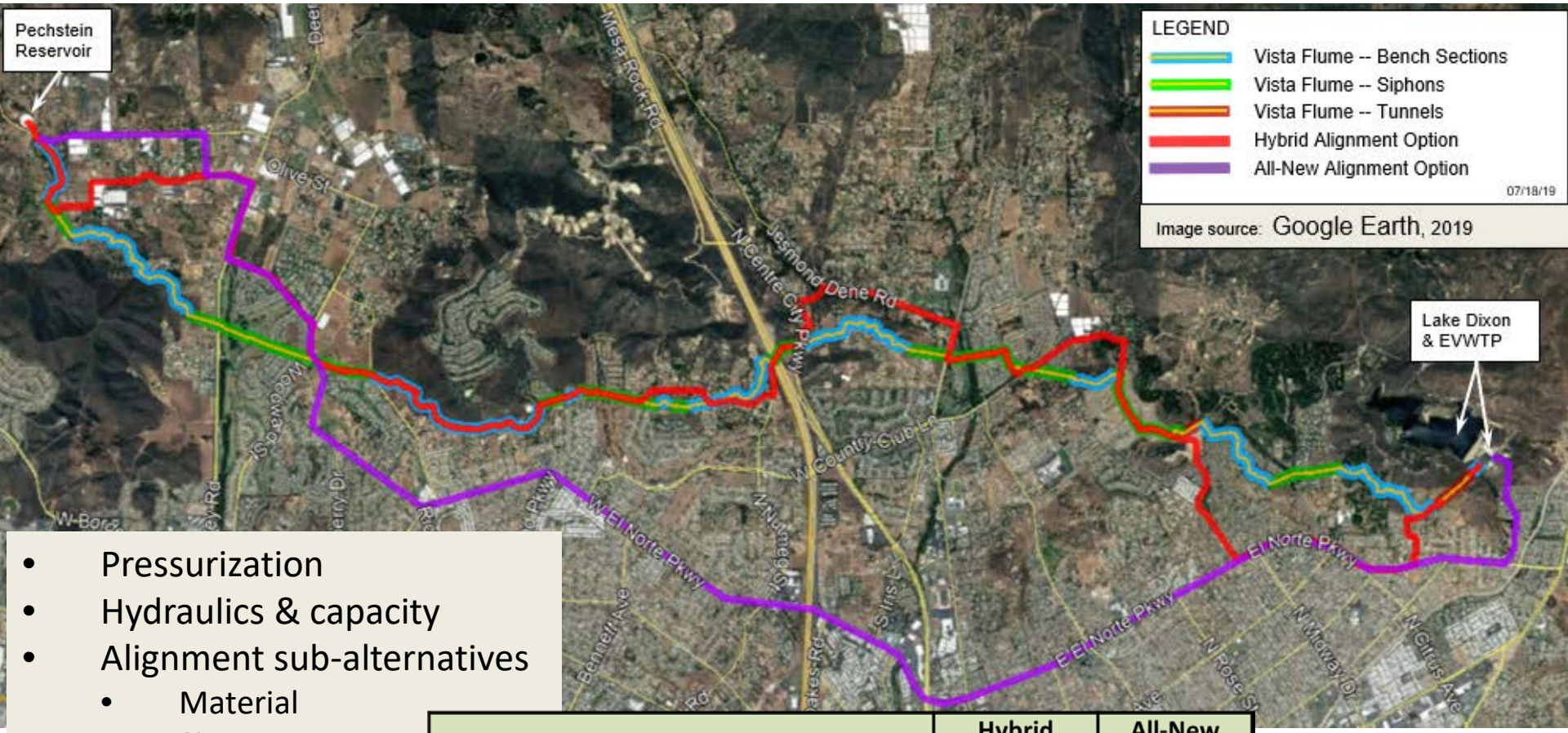
Cost Saving Opportunities

1. Using PVC pipe
2. Reducing capacity
3. Condition assessments of siphons (potential)

Construction Phasing



Moving into Fine Screening



- Pressurization
- Hydraulics & capacity
- Alignment sub-alternatives
  - Material
  - Size
  - Method
  - Route
- Phasing

Cost Item	Hybrid ($2019) (millions)	All-New ($2019) (millions)
New Pipeline	$ 68	$ 77
Siphon Structural Relining	$ 10	--
Bench Demolition and Siphon Abandonment	$ 7	$ 8
Subtotal – Construction Costs	**$ 85**	**$ 85**
Design / Admin. / Permitting / ROW @ 35%	$ 30	$ 30
Total Project Cost (Rounded)	**$115**	**$115**

CONCLUSIONS

Comparison of Major Cost Components

Equivalent Unit Costs in $2019

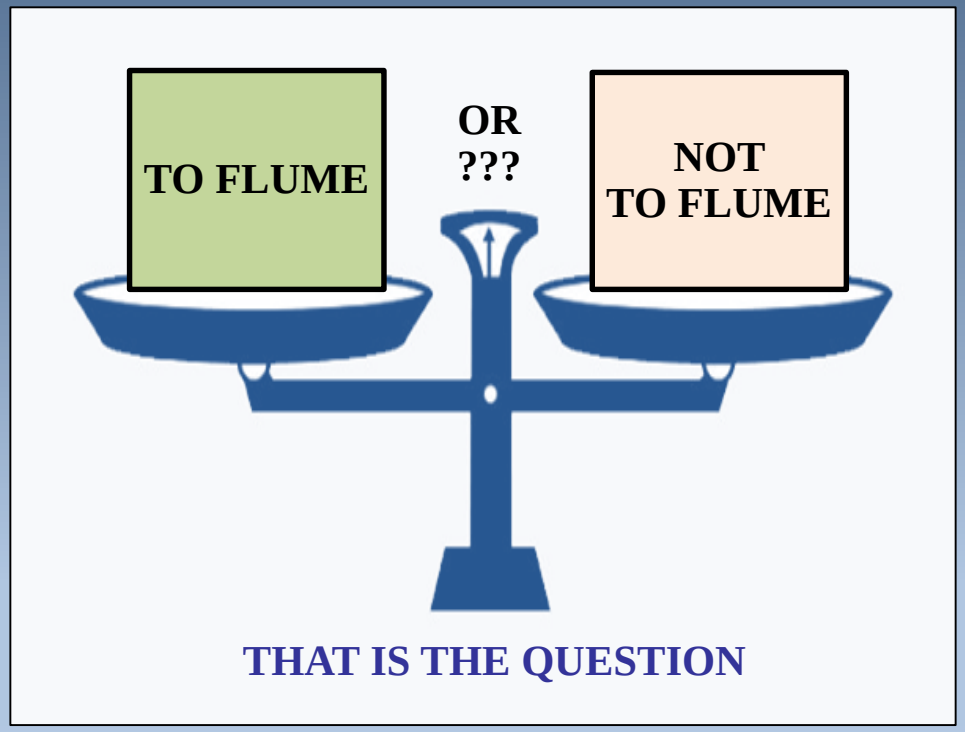
NOT TO FLUME	
Increased Water Authority Purchases	↑↑ $1,700/AF
Exchange Benefit (Net of Local System Costs)	↑ ($75/AF) (benefit)
Delivery Reliability	$90/AF
Boot and Bennett Transfer to Vallecitos	$140/AF
TOTALS (Rounded)	**$1,900/AF**

TO FLUME	
Local Water System Long-Term O&M	↑ $890/AF
Flume Replacement	$1,080/AF
Self-Treatment Benefit	↑ ($110/AF) (benefit)
TOTALS (Rounded)	**$1,900/AF**

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	↑
?	Intrinsic Values	?

SENSITIVITY ANALYSIS / UPSIDES AND DOWNSIDES / ISSUES FOR REFINEMENT

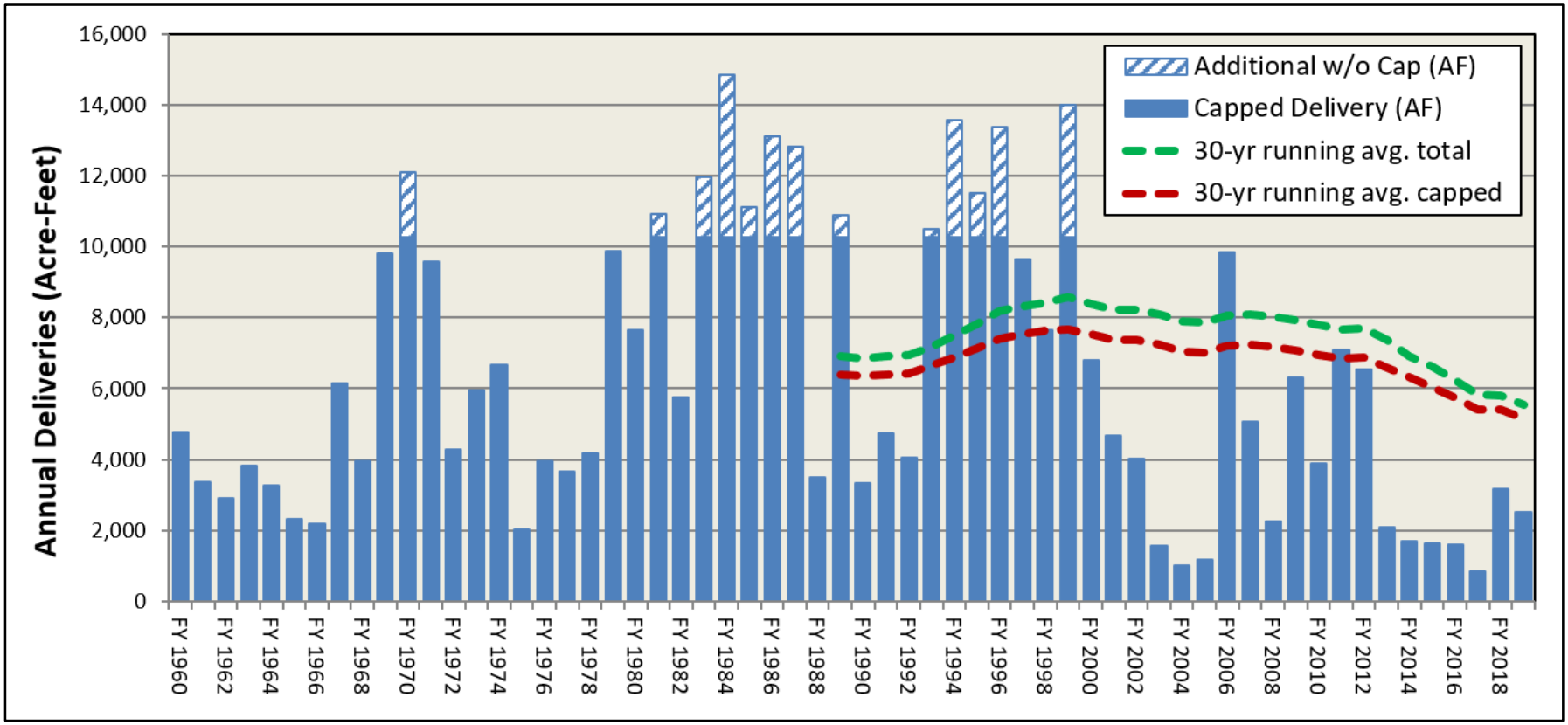


TOPICS

1. Local Yield
2. Water Authority Rates
3. Financial Terms, Low-Interest Loans, and Borrowing Capacity
4. Exchange Revenues
5. Flume Cost / Options for Economy
6. Flume Pressurization / DDW Review

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

Local Water Deliveries to District 1960-2018



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

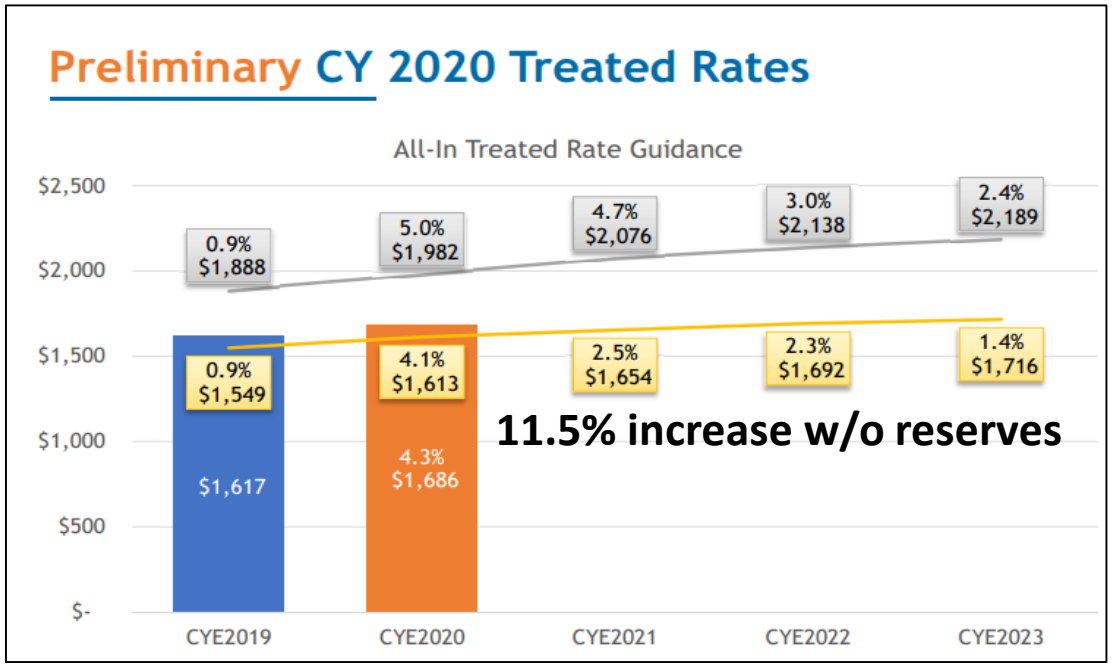
Local System Future Average Annual Yield

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 30-year average hydrology, 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**

2. Water Authority Rates: Potential for rates to increase faster than inflation

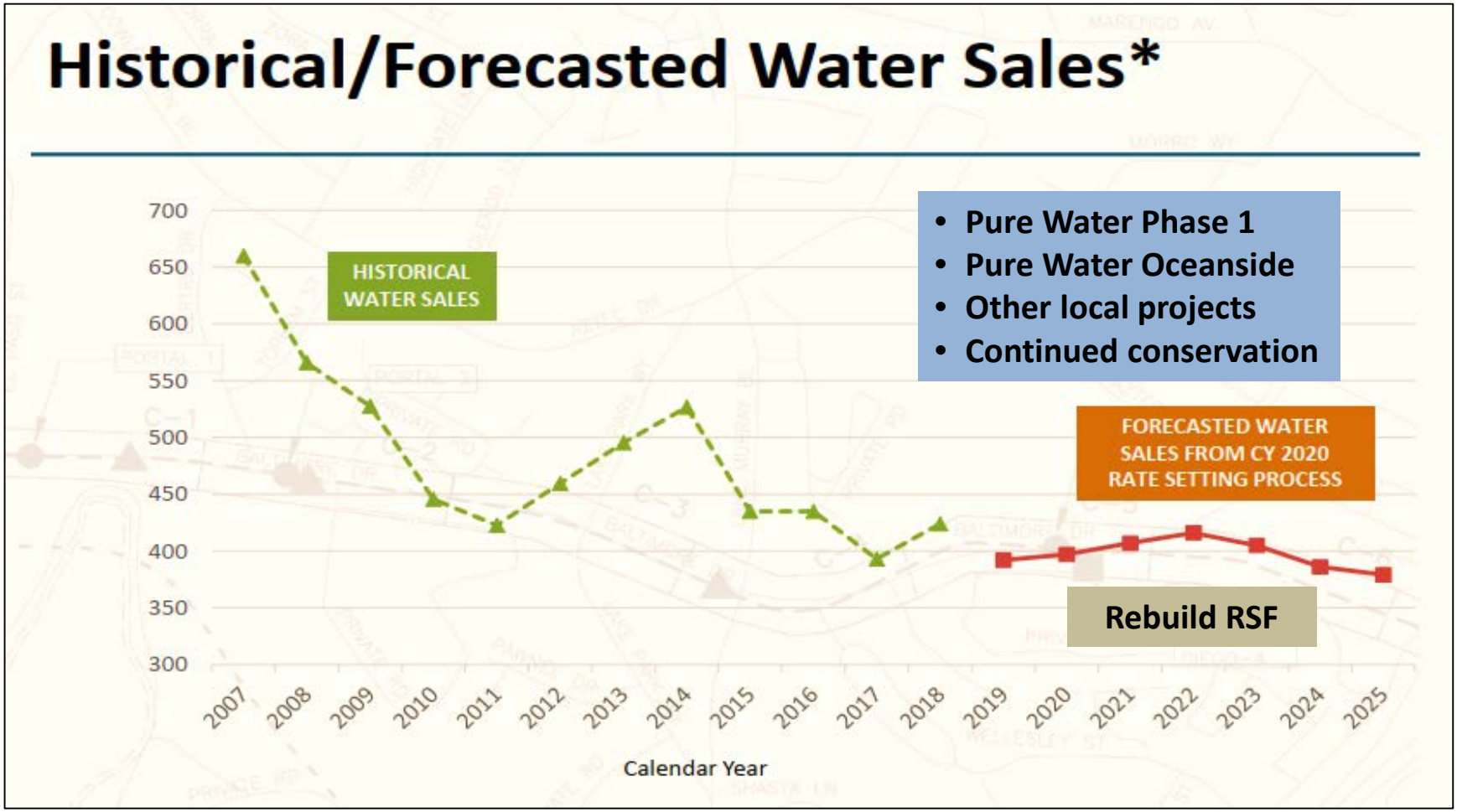
2. Water Authority Rates: Potential for rates to increase faster than inflation

- Decreasing Sales
- Increasing Supply Costs
- $1.5 Billion in outstanding debt
- Using Reserves to reduce rate increases
  - $22 M in 2019 Rates
  - $46 Million in 2020 Rates
  - Required to rebuild reserves in beginning 2023

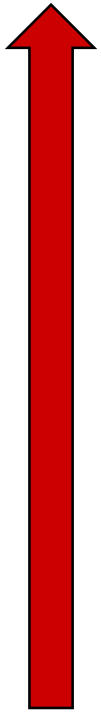
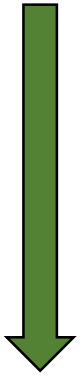


- No longer on low rate trajectory
- Likely to high or above high rate forecast

2. Water Authority Rates: Reduced sales reduce revenue needed to cover fixed costs



2. Water Authority Rates: Rate pressure appears predominantly upward

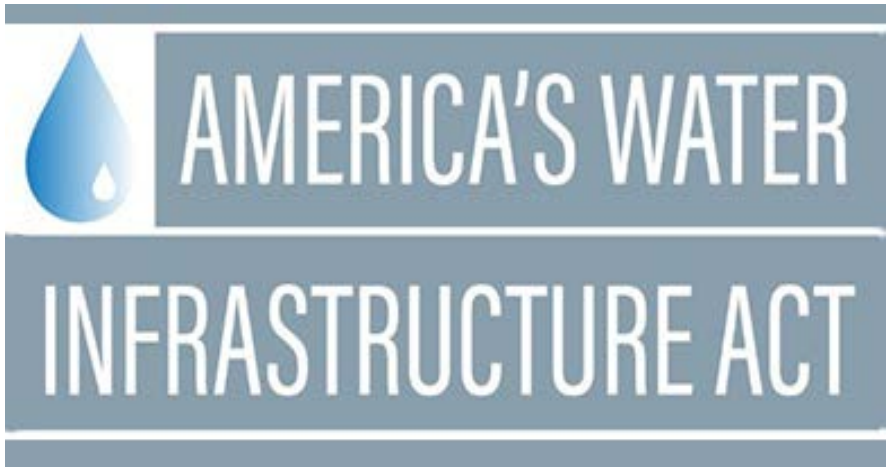
Upward Rate Pressures (factors favoring higher annual rate increases)	**Downward Rate Pressures** (factors favoring more moderate annual rate increases)
 • **Reduced Sales** due to conservation and local supply development • Greater portion of total **supply derived from most expensive sources**, Desal 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**

3. Financial Terms, Low-Interest Loans, and Borrowing Capacity: Assume i = 3.5%/yr

District Finance Rates and Terms

Scenario	Description	Interest Rate (%/yr)
Low (Optimistic)	Reflects optimistic bond market conditions and potential for District eligibility for State Revolving Fund low-interest financing	**3.0**
Mid-Range	Current market conditions	**3.5**
High (Pessimistic)	Less favorable market conditions	**4.0**

3. Financial Terms, Low-Interest Loans, and Borrowing Capacity: Loan Potential



Borrowing Capacity: To be reviewed during fine screening

4. Exchange Revenues: Unit rate uncertain, to be refined during fine screening

Net Transfer Benefits After Local Water System Costs

Scenario	Description	Net Unit Revenue (Loss)
Worst Case	No transfer deal. District remains responsible for local water system costs, less treatment.	**($660/AF)** (Loss; costs > revenues)
Low (Pessimistic)	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, but only 50 percent of average yield sold.	**($250/AF)** (Loss; costs > revenues)
Mid-Range	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, 75 percent of average yield sold.	**$75/AF** (Net gain)
High (Optimistic)	Transfer deal. Unit price equal to mid-point between local water system costs and Water Authority rate, 100 percent of average yield sold.	**$400/AF** (Net gain)

5. Flume Cost: Cost Estimate Review and Refinement

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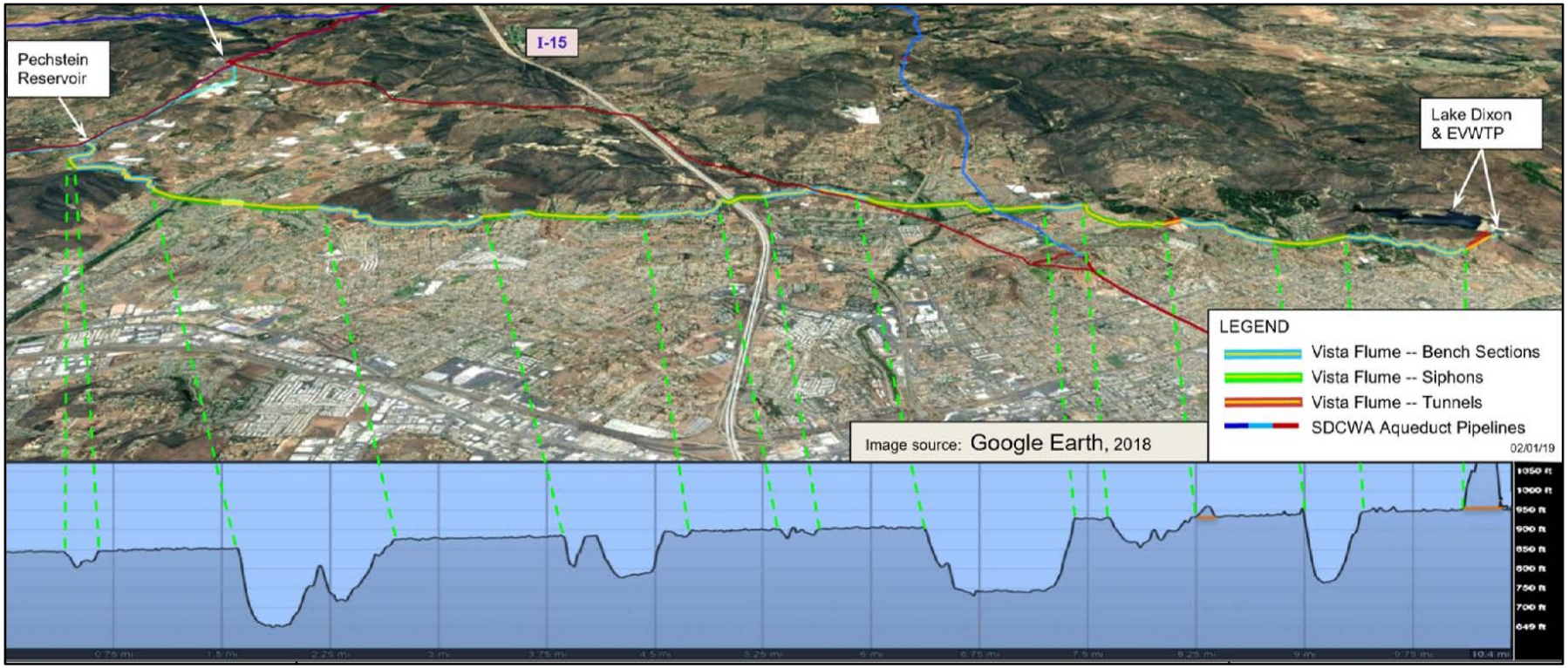
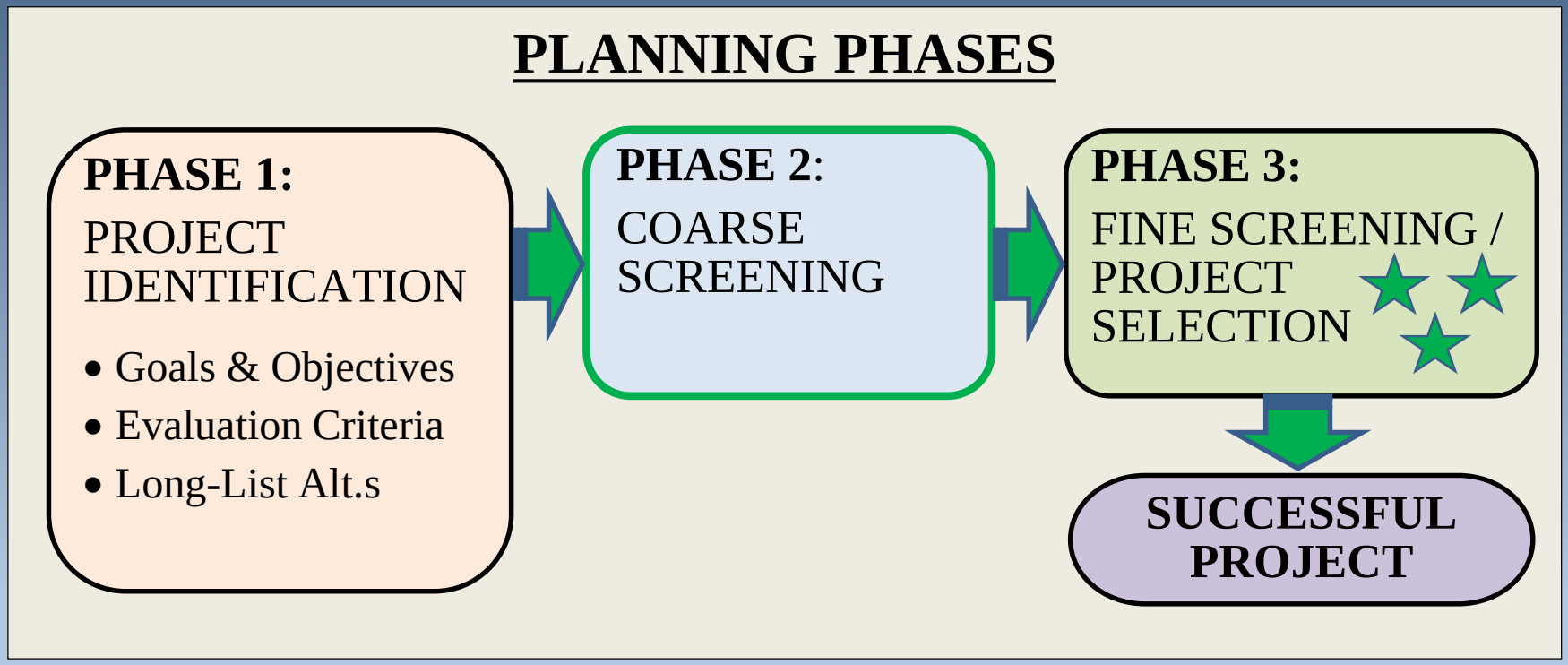
6. Flume Pressurization and DDW Review: Industry standard for treated water is pressurization



Fine Screening: Meet with DDW to review

NEXT STEPS / SCHEDULE



Planning Workshop No. 3: ~Nov/Dec 2019