

Peacock Gap Recycled Water Transmission Pipeline Project Preliminary Design Report

PREPARED FOR

Marin Municipal
Water District



PREPARED BY



Peacock Gap Recycled Water Transmission Pipeline Project Phase I

Prepared for

Marin Municipal Water District

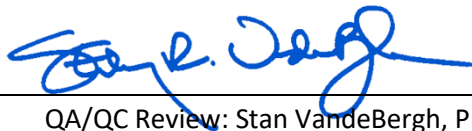
Project No. 905-30-22-03



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10-07-22

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10-07-22

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LIST OF ACRONYMS AND ABBREVIATIONS

ACOE	Army Corps of Engineers
BCDC	Bay Conservation and Development Commission
CDFW	California Department of Fish and Wildlife

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CEQA	California’s Environmental Quality Act
City	City of San Rafael
County	Marin County
City	City of San Rafael
County	County of Marin
CPT	Cone Penetration Tests
District	Marin Municipal Water District
ESA	Endangered Species Act
HDD	Horizontal Directional Drilling
HOA	Homeowners Association
IS/MND	Initial Study/Mitigated Negative Declaration
JARPA	Joint Aquatic Resource Permit Application
LEDPA	Least Environmental Damaged Proposed Action
LGVSD	Las Gallinas Valley Sanitary District
M	Million
MCSTOPP	Marin County Storm Water Pollution Prevention Program
MGD	Million Gallons Per Day
MMI	McMillen Jacobs Associates
MTC	Metropolitan Transportation Commission
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
Panorama	Panorama Environmental, Inc
PCI	Pavement Condition Index
PDR	Preliminary Design Report
PG&E	Pacific Gas & Electric Company
Project	Peacock Gap Recycled Water Transmission Pipeline
P-TAP	Pavement Management Technical Assistance Program
RFP	Request for Proposal
SMART	San Rafael Marin Area Regional Transit
SRSD	San Rafael Sanitary District
State Parks	China Camp State Park
Study	Geotechnical Desktop Study
US 101	Highway 101
USA	Underground Service Alert
USACE	United States Army Corps of Engineers

Peacock Gap Recycled Water Transmission Pipeline

1.0 EXECUTIVE SUMMARY

The Marin Municipal Water District (District) issued a Request for Proposals (RFP) in late 2021 for the Peacock Gap Recycled Water Transmission Pipeline (Project) and selected West Yost in early 2022 to perform preliminary design services to compare three (3) potential alignments for the District's planned recycled water expansion. Each of the three alignments connects to existing District recycled water infrastructure and expands to the Peacock Gap area of San Rafael. The Project was divided into two (2) phases. Phase 1 includes an alternatives analysis of the three (3) alignments and a preliminary design of the District's preferred alignment culminating in this Preliminary Design Report (PDR). Phase 2 will involve performing detailed design and preparing final bid documents.

The District identified three (3) pipeline alignments to analyze and compare for the Project that are referred to in this PDR as follows:

1. South Alignment
2. North Alignment
3. Bay Alignment

To perform a detailed analysis of the alternatives, a thorough understanding of the site conditions, District preferences, stakeholder input, permit requirements, and environmental constraints were obtained by performing the following tasks:

- Reviewing all documents provided by the District
- Requesting maps from utility providers and preparing an existing utility basemap
- Attending meetings with permitting agencies and project stakeholders
- Performing a geotechnical desktop study of the Project area
- Reviewing documents and performing desktop studies related to potential cultural and biological Project constraints
- Walking/driving all alignments to review utility features and assess Project site constraints

District staff performed all required hydraulic modeling to confirm pipeline sizing and system hydraulics. They also provided an estimate of anticipated recycled water demands along each alignment.

Using all data and information gathered during the activities listed above, the design team collaborated with District staff to develop a set of objective evaluation criteria that was used to compare the alternatives. Each criteria was then assigned a weight to ensure that it was scored in accordance with District priorities. The final criteria and weightings were reviewed and approved by the District before being assigned scores by the design team.

The three alternatives were then evaluated for each of the established design criteria considering unique site constraints, potential sub-alternatives, anticipated costs, and anticipated recycled water demand for each alignment. Unfortunately, during the alternative evaluation, State Parks issued a letter (Appendix C) stating that the State would not support a new pipeline across their property making the Bay Alignment and North Alignment infeasible. However, even without consideration of the letter from State Parks, final scoring established that the South Alignment is the District's preferred alignment for the Project and would best suit the District's priorities. The Project is anticipated to cost approximately \$26.7 million (M)

and take between 1 to 2 years to construct depending on weather, permit requirements, and site constraints. The South Alignment is anticipated to cost twice as much as the North Alignment but is equal to the North Alignment on a cost per acre-foot basis (\$94,000 per ac-ft) since it is anticipated to deliver twice the potable demand offset. The South Alignment is anticipated to serve approximately 67 connections within the District's service area with recycled water (the largest number of anticipated connections between the three alternatives), offsetting average daily demand of potable water by up to 254,000 gallons (285 acre-feet [ac-ft] annually). The average daily demand offset is the estimated maximum potential based on the previous 10-year daily demand averages. Future water demand offset may differ due to conservation and drought resistant landscaping trends.

2.0 INTRODUCTION

The District owns and operates 24 miles of recycled water transmission and distribution pipelines serving over 300 recycled water service connections throughout the cities and communities of San Rafael, Terra Linda, Santa Venetia, Los Ranchitos, and Marinwood. The system provides one million gallons of recycled water per day to customers in the northern area of the distribution system for a range of uses including irrigation, industrial cooling, and toilet flushing.

The District receives recycled water from longstanding partner Las Gallinas Valley Sanitary District (LGVSD) and recently helped fund an expansion of their recycled water facility to increase recycled water output from 3 million gallons per day (MGD) to 5 MGD. The District now plans to expand its recycled water program to the Peacock Gap area of San Rafael to capitalize on the treatment plant's increased potential output. Supplying large capacity customers, such as the Peacock Gap Golf Club, with recycled water will not only reduce demand on the District's potable water supply, but also serve as a reliable, renewable resource for the future. Once the pipeline is installed, there may be additional opportunities to expand recycled water usage to nearby schools, parks, medians, residences, and businesses depending on the final alignment chosen.

The design team for the Project is comprised of the following members:

Firm	Services
Primary Consultant	
West Yost	Project Management, Design, and QA/QC
Subconsultants	
McMillen Jacobs Associates	Geotechnical Engineering and Trenchless Design
Panorama Environmental, Inc (Panaroma)	Environmental Compliance
W-Trans	Traffic Engineering (as needed)
Cinquini & Passarino ^(a)	Survey
(a) Surveying will only occur during Phase 2.	

3.0 DESCRIPTION OF ALTERNATIVES

Per the RFP, the District identified three (3) pipeline alignments to analyze and compare for the Project that are referred to in this PDR as follows:

1. South Alignment
2. North Alignment
3. Bay Alignment

Modeling efforts by District staff have determined that all alignments will require the installation of a 12-inch diameter transmission pipeline between the source connection and the Peacock Gap Golf Club with no need for a booster pump station. Branch connections and secondary pipelines will be less than 12 inches in diameter. There are also some pipeline segments that will need to be installed regardless of the final alignment chosen. An overall map of the alignments is shown in Figure 1 and each alignment is described below. Figures 2 through 4 illustrate the linear footages and pipeline diameters planned for each of the alternatives.

3.1 Segments Common to All Alignments

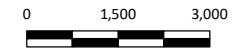
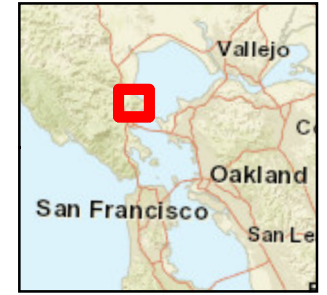
In general, each alignment will need to convey recycled water to the Peacock Gap Golf Club from either the District's existing recycled water system or the LGVSD treatment plant. The golf course is irrigated through two (2) separate service connections, both of which need to be supplied with recycled water to fully irrigate the golf course. The primary service point is located along Peacock Drive near the intersection of McNear Drive, while a secondary service point is located on Biscayne Drive.

Additionally, the Project is currently anticipated to include converting the District's potable water reservoir, Peacock Gap Tank TK-159 (Peacock Gap Tank), to a recycled water storage tank. The rectangular concrete tank was built in 1985 in the hill north of the golf course and has a capacity of approximately 0.5 MG. There is currently a pipeline connecting the tank to the District's domestic system in Biscayne Drive; however, we are currently making a conservative assumption that a new pipeline will need to be constructed between Biscayne Drive and the Peacock Gap Tank.

Therefore, all alignment alternatives will require approximately 6,400 feet of the new pipeline to be installed within Biscayne Drive, Peacock Drive, and the hill north of Biscayne Drive to connect the new pipeline to the tank and golf course. These segments common to all alignments are not discussed in this report in detail as they will need to be constructed regardless of what alternative is chosen.

3.2 South Alignment

The South Alignment connects to the District's existing recycled water system at the end of Merrydale Road and proceeds in a southeast direction along the existing bike path running parallel to US 101. It then enters Lincoln Avenue and continues southeast until it reaches Linden Lane. The alignment then turns northeast in Linden Lane and uses an existing underpass to cross beneath US 101 and the San Rafael Marin Area Regional Transit (SMART) tracks, before continuing southeast in Grand Avenue. The alignment then remains in Grand Avenue until it turns east in Mission Avenue. The alignment then heads south in Union Street before turning east in Point San Pedro Road and staying in Point San Pedro Road for approximately 4 miles. From Point San Pedro Road, the alignment heads west in Biscayne Drive where it joins the segments that are common to all alignments. The alignment totals approximately 46,000 feet in length, including those segments that are common to all alternatives.



Scale in Feet

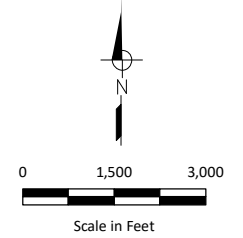
- Peacock Gap Tank TK-159
- Common to All Alignments
- North/Bay Common Alignment
- Bay Alignment
- North Alignment
- South Alignment
- South Alignment Alternatives



Figure 1

Peacock Gap RW Pipeline Alignment Overview

Marin Municipal Water District
Peacock Gap
Recycled Water (RW) Project



Pipe Diameter (in)

- 12" Pipe
- 6" Pipe
- Peacock Gap Tank TK-159



Figure 2

Peacock Gap RW Pipeline South Pipe Diameters

Marin Municipal Water District
Peacock Gap
Recycled Water (RW) Project

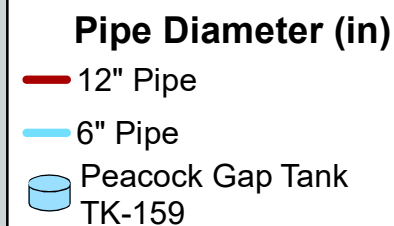
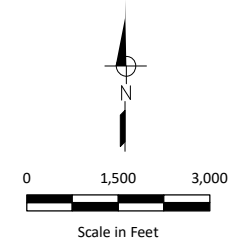
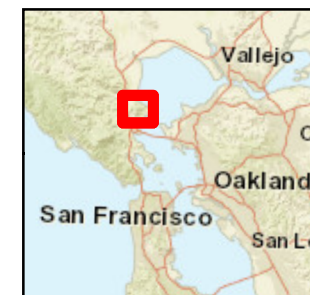
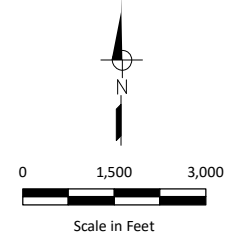
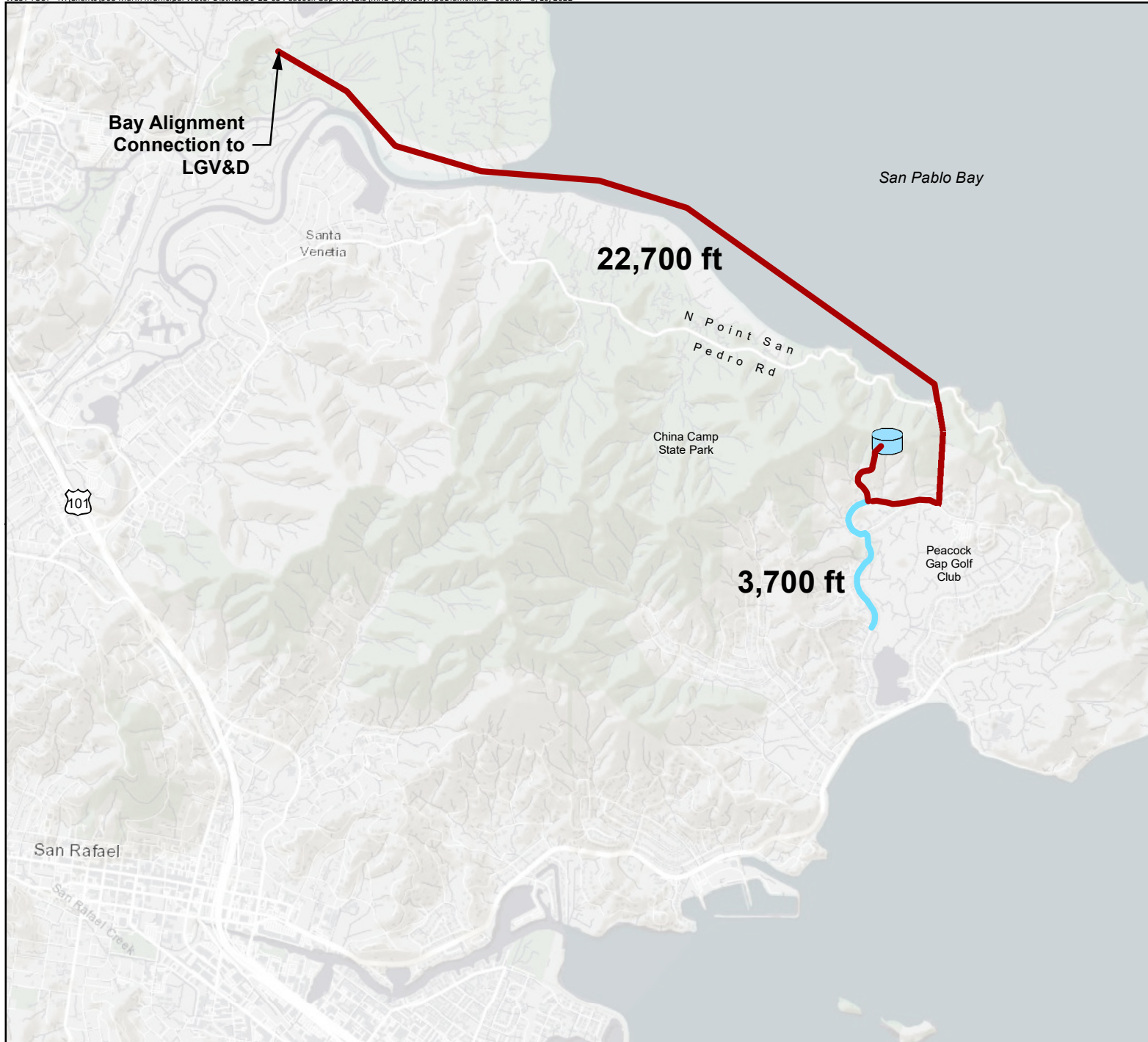


Figure 3

**Peacock Gap RW Pipeline
North Pipe Diameters**

Marin Municipal Water District
Peacock Gap
Recycled Water (RW) Project




- Pipe Diameter (in)**
- 12" Pipe
 - 6" Pipe
 -  Peacock Gap Tank TK-159



Figure 4

**Peacock Gap RW Pipeline
North Pipe Diameters**

**Marin Municipal Water District
Peacock Gap
Recycled Water (RW) Project**

3.3 North Alignment

The North Alignment connects to the District's existing recycled water system at the intersection of Schmidt Lane and North San Pedro Road. It then heads northeast in North San Pedro Road for approximately 3.5 miles before heading south through China Camp State Park. The alignment utilizes an existing roadway that passes the existing China Camp Visitors Center before continuing through a mountain pass in the hills north of the Peacock Gap Golf Club. It then joins the segments that are common to all alignments once it reaches Biscayne Drive. The alignment totals approximately 30,000 feet in length including those segments that are common to all alternatives.

3.4 Bay Alignment

The Bay Alignment connects directly to the LGVSD recycled water facility and traverses existing marsh land and a portion of San Pablo Bay for approximately 17,000 feet. The pipeline leaves San Pablo Bay near the existing roadway that heads towards the China Camp State Park Visitors Center and continues along the same path as the North Alignment through China Camp State Park to Biscayne Drive. The alignment totals approximately 26,000 feet in length including those segments that are common to all alternatives.

4.0 INFORMATION GATHERING AND DESKTOP STUDIES

To perform a detailed analysis of the three (3) alternatives, a thorough understanding of the site conditions, District preferences, stakeholder input, permit requirements, and environmental constraints were obtained by performing the following tasks:

- Reviewing all documents provided by the District
- Requesting maps from utility providers and preparing an existing utility basemap
- Attending meetings with permitting agencies and project stakeholders
- Performing a geotechnical desktop study of the Project area
- Reviewing documents and performing desktop studies related to potential cultural and biological Project constraints
- Walking/driving all alignments to review utility features and assess Project site constraints

These activities are summarized in this section, and eventually assisted in the development of the final evaluation criteria described later in this PDR.

4.1 District Documents

The District provided several documents that were reviewed by West Yost. A general summary of the documents provided is included in Table 1 below.

Peacock Gap Recycled Water Transmission Pipeline



Table 1. District Document Summary

Document	Description of Content	Date
Las Gallinas Recycled Water System Summary	Description of tanks and pumps used to operate the existing recycled water system	n/a
Recycled Water System Distribution Pump Station Plan	Mechanical drawing of the recycled water system distribution pump station	2018
Submittal 0092-B of the LGVSD RW Expansion (Pump Info)	Contractor submittal for the centrifugal pumps installed as part of the LGVSD RW expansion project	2019
Example Design Projects	Plans and specifications for projects D20021 E. Blithedale, D180012 Almonte, and F18006 Monterey Avenue	2019, 2017, 2018
Approximated ac-ft Beneficial Use Estimate	Spreadsheet with estimates for how much recycled water could potentially be used by customers along the North and South alignments	2022
Various Documents from the Previous Project Iteration	Agendas and minutes prepared by Panorama and District, internal District memos, email threads, calculation spreadsheets, draft maps/figures	various
Draft Engineering Report for Project D10042	Engineering report outlining the project specifics	2015
Previous Admin Draft of the Initial Study/Mitigated Negative Declaration (IS/MND)	Admin draft of IS MND prepared by Panorama	2014
Previous Design Drawings	Draft design drawings in DWG and PDF format	2010

The following is a summary of key findings from the review of District-provided documents:

- An internal District memo from Jon LaHaye to Paul Sellier dated April 19, 2007 provides a thorough description of the modeling that was performed to evaluate the hydraulic characteristics of the Project. In summary, the memo shows that a 12-inch diameter pipeline is sufficient and will produce approximately 600 gallons per minute as long as the Peacock Gap tank is converted from a potable storage reservoir to a recycled storage reservoir. Additionally, the Peacock Gap Tank would provide sufficient storage to irrigate the golf course as well as 50,000 to 60,000 gallons per day of additional peak season consumption. Notably, the memo also states that the impact of converting the Peacock Gap Tank to a recycled water tank was not investigated at the time.
- An internal District memo dated April 24, 2007 from Paul Sellier to Bob Castle outlined two sub-alternatives for the North Alignment that were reviewed for feasibility. One sub-alternative involved connecting directly to the LGVSD recycled water treatment facility and using levy roads and a trenchless crossing of Las Gallinas Creek which presented numerous environmental obstacles and required 1,000 more feet of pipeline compared to connecting to the existing system at Schmidt Lane. The other sub-alternative involved using roads within China Camp State Park to shorten the pipeline length but required a pump station and extensive permitting. Both sub-alternatives were not recommended at the time.

Peacock Gap Recycled Water Transmission Pipeline



- It is understood that the Project was discussed with the County in 2009 per two (2) letters dated May 22, 2009 from Kevin McDonnell. One letter was addressed to Berenice Davidson and the other was addressed to Ernest Klock. The letters referred to a pending County road overlay project of North San Pedro Road that was scheduled to begin before the pipeline installation could be completed. These letters reflect a long history of the District attempting to coordinate work with the County along North San Pedro Road.
- On May 15, 2009, the District met with State Parks to discuss obtaining an easement and a right-of-entry for environmental field investigations. At this meeting, State Parks expressed a possible interest in converting some of their potable water use to recycled water.
- On August 31, 2009, State Parks granted the District a right-of-entry permit to conduct natural and cultural field data collection, surveying, and other planning work. The permit was set to expire June 30, 2010.
- A draft project status report from February 2010 describes how failing to install the pipeline prior to the County's pavement overlay project was going to cause the District to spend upwards of an additional \$1M for pavement restoration.
- Per an email thread provided by the District dated April 27, 2010, it was documented that State Parks was asking the District to justify the need to grant an easement through their property in order to install what we would now consider to be the North Alignment. Although system modeling at the time suggested that an alternative alignment around the tip of the peninsula would not significantly affect the hydraulic capacity of the pipeline, known cultural resource sites were known to exist making an alignment around the tip of the peninsula problematic.
- An email thread dated May 18, 2010 between District staff Kevin McDonnell and Bob Castle suggests that the pipeline along Point San Pedro Road was once designed to be smaller than 12 inches in diameter. This email suggests that increasing the pipeline to 12 inches in diameter would help to limit the need for future expansion of the system.
- A cost estimate dated 2015 shows a total project cost of approximately \$24M for what was called the "south alignment" and \$26M for what was called the "north alignment." These costs appear to reflect the alignments described in the 2015 Engineering Report which differ in scope and size from the alignments described in this PDR.

Table 2 provides the 2015 Engineering Report summary of the old "north" and "south" alignments:

Table 2. 2015 Engineering Report Summary		
Item	North Route	South Route
Potential RW Usage (ac-ft)	320	361
Pipeline Length (feet)	49,800	52,700
Project Cost (\$M)	\$23M	\$22M
Cost per ac-ft	\$72k	\$61k
CEQA Requirements	Full EIR	Not specified
Special Considerations	Elevated causeway required to restore tidal flows	No easements required

4.2 Utility Coordination and Mapping

It is generally understood that the South Alignment contains many more existing utilities than the North Alignment. To evaluate how congested the existing utility corridors are along both North and South Alignments, facility maps were requested from all utility providers that participate in Underground Service Alert (USA). A summary of the outreach that was performed is provided in Table 3 below. Reference documents and contact log are provided in Appendix A.

Table 3. Utility Provider Map Summary			
Company	Utility Type	Maps Requested	Maps Received
AT&T	Communications	Y	Y
San Rafael Sanitary District (SRSD)	Sewer	Y	Y
City of San Rafael Public Works	Storm	Y	Y
Comcast	Communications	Y	Y
Golden Gate Bridge (Highway and Transportation District)	Transportation	Y	N ^(a)
Las Gallinas Valley Sanitary District (LGVSD)	Sewer	Y	Y
MCI (Verizon)	Communications	Y	Y
Pacific Gas & Electric Company (PG&E)	Gas, Electric	Y	Y
Sonic Telecom	Communications	Y	Y
Terradex Inc	Environmental	Y	N ^(a)
Zayo	Communications	Y	Y
Marin County Public Works	Storm	Y	Y
Caltrans – District 4	Transportation	Y	Y
Sonoma Marin Area Rail Transit (SMART)	Transportation	Y	Y
China Camp State Park (State Parks)	Water, Communications	Y	N
Peacock Gap Golf Club	Water, Irrigation	Y	Y
(a) Confirmation was provided that Provider does not have facilities within the Project area			

The maps received were reviewed and used to prepare an existing utility base map using Autodesk Civil 3D. The District decided not to perform a topographic survey during Phase 1; therefore, all utility mapping and preliminary design used a high-resolution aerial image as a basis for horizontal control. As such, all utility mapping will need to be reviewed and refined as necessary once a topographic survey is prepared during Phase 2.

While the utility mapping is preliminary without a topographic survey, reasonable assertions can be made as to the level of utility congestion along the alignment corridors. Further discussion related to the degree of utility congestion along each alignment is discussed in further detail later in this PDR.

4.3 Stakeholder Coordination

Due to the many permitting agencies, property owners, and right-of-way managers along the subject alignments, our team needed to meet with various stakeholders to gain insights into the potential requirements to construct each alignment. The results of these meetings were eventually used by the team and District in developing the final evaluation criteria. Table 4 below summarizes the meetings that took place. All meetings were held virtually either via Microsoft Teams or Zoom.

Table 4. Stakeholder Meeting Summary			
Stakeholder	Date / Time	Objective	Attendees
Marin County (County)	3/23/22 at 2:30pm 4/5/22 at 10am	Understand permit requirements and design constraints related to alignment segments within County jurisdiction as well as obtain general feedback	Adam Brown (West Yost) Dan Bryden (West Yost) Tania Treis (Panorama) ^(a) Rita Wilke (Panorama) ^(a) Zachary Talbott (District) ^(a) Alex Anaya (District) ^(a) Eric Miller (County) Rosemarie Gaglione (County) ^(a)
City of San Rafael (City)	3/30/22 at 1:30pm	Understand permit requirements and design constraints related to alignment segments within City jurisdiction as well as obtain general feedback	Adam Brown (West Yost) Dan Bryden (West Yost) April Miller (City) Bill Guerin (City)
SMART	3/30/22 at 4pm	Understand permit requirements and design constraints related to potential locations where a new pipeline would need to be installed across SMART right-of-way/facilities as well as obtain general feedback	Adam Brown (West Yost) Dan Bryden (West Yost) Randy Friedland (SMART) Nina Diamzon (SMART) Aaron Parkes (SMART) John Riley (SMART)
State Parks	4/18/22 at 3pm	Understand permit requirements, easement needs, and design constraints related to pipeline segments that could be installed within lands managed by California State Parks as well as obtain general feedback	Adam Brown (West Yost) Dan Bryden (West Yost) Tania Treis (Panorama) Rita Wilke (Panorama) Zachary Talbott (District) Alex Anaya (District) Crystal Yezman (District) Cindy Shafer (Parks) Bree Hardcastle (Parks) Michelle Squyer (Parks)

Table 4. Stakeholder Meeting Summary

Stakeholder	Date / Time	Objective	Attendees
State Lands Commission	5/2/22 at 3pm	Gain an understanding for what lands adjacent to the alignments may be owned by the State and what design and easement requirements for segments on State property would be required (including the Bay alignment)	Adam Brown (West Yost) Dan Bryden (West Yost) Tania Treis (Panorama) Rita Wilke (Panorama) Zachary Talbott (District) Alex Anaya (District) Al Franzoia (State Lands)
Marin County Storm Water Pollution Prevention Program (MCSTOPPP)	5/5/22 at 11am	Gain general feedback and input from several permitting agencies related to all alignments (Water Board, US ACOE, National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries).	Adam Brown (West Yost) Dan Bryden (West Yost) Tania Treis (Panorama) Rita Wilke (Panorama) Alex Anaya (District) Crystal Yezman (District) Nicole Fairly (Water Board) William Conner (ACOE) Dan Logan (NOAA) Howard Bunce (County)
Bay Conservation and Development Commission (BCDC)	5/20/22 at 1pm	Gain an understanding for what portions of the alignments fall under BCDC's jurisdiction and what permit requirements might be imposed	Adam Brown (West Yost) Tania Treis (Panorama) Rita Wilke (Panorama) Zachary Talbott (District) Alex Anaya (District) Crystal Yezman (District) Anniken Lydon (BCDC)
Peacock Gap Golf Club	5/23/22 at 1:15pm	Gain a better understanding of the golf course's irrigation facilities while providing them with a project status update and soliciting any additional feedback necessary	Adam Brown (West Yost) Dan Bryden (West Yost) Zachary Talbott (District) Alex Anaya (District) Crystal Yezman (District) Andrew McCullough (Golf Club) Michael Ghiorso (Golf Club) Joseph Reilly (Golf Club)
Caltrans	n/a	Review the potential crossing locations and obtain general feedback related to permits, approvals, and timing	Several Caltrans employees were contacted to discuss the Project, but no one responded to our requests for a meeting
(a) Only attended the 2nd County meeting.			

4.3.1 Marin County

An initial meeting was held with Eric Miller in attendance as the only County representative. The purpose of the meeting was to provide Eric with an overview of the project so he could schedule a second meeting with the appropriate County staff.

The second meeting included the County's Public Works Director, Rosemarie Gaglione, and produced the following feedback:

- The County noted that the Bay Alignment appeared to be the least impactful to the different stakeholders.
- The County noted that the North Alignment could have some beneficial overlap with the County's plans to improve or relocate North San Pedro Road; however, the timing required to do that does not appear to be favorable as the County is in the early stages of comparing alternatives and does not appear to be on track for construction prior to 2025.
- The County indicated that the most likely alternative for the North San Pedro Road project would be to raise the roadway using earthen embankments except where raised arch culverts would be installed to reinstate historic tidal flows that have been disturbed by the existence of the current roadway. As such, any pipeline constructed prior to the roadway being improved may conflict with the proposed improvements.
- The County mentioned that the neighborhood near the westerly terminus of the North Alignment between the streets of Vendola Drive and North San Pedro Road was built on imported fill and is known to sink approximately ½" per year (plus or minus), indicating that the soils along the North Alignment may be challenging.
- The County indicated that cultural deposits along the North Alignment would need to be considered.
- The County discussed enhanced pavement restoration requirements that will be required along the South Alignment due to the current pavement condition and encroachment permit requirements. It was mentioned that the South Alignment enters and exits City/County right-of-way along Point San Pedro Road in three (3) locations, so some amount of coordination between the City and County encroachment permits will be required, but it wasn't thought to be an issue of concern. It was noted that approximately 75 percent of the South Alignment is in City right-of-way while the rest would fall under the County's jurisdiction.
- Overall, the County sees the project as an important Project that is extremely beneficial to the area and would not oppose the Project if it moves forward.

4.3.2 City of San Rafael

Following a brief overview of the alignments, the City initially responded as preferring the South Alignment over the other two due to the City's desire to get recycled water as close to downtown as possible. The design team asked the City about any potential traffic concerns, pipeline segments potentially needing to be performed at night, and any preferred locations for crossing US 101 and SMART. In general, the City expressed strong support for this project and did not express strong preferences or opinions regarding those items. The City stated that, in general, standard encroachment procedures would apply to the Project, and they would seek to support the Project. It was also discussed that the City may want to plan street/American

Peacock Gap Recycled Water Transmission Pipeline



Disabilities Act (ADA) improvements within the project area during the same general time frame (following pipeline installation) depending on the level of anticipated disturbance.

We were informed that road pavement restoration will likely be a major consideration for the South Alignment, and we were pointed to the Road Moratorium Geographic Information System (GIS) application on Marin County's "Marin Map" website (<https://www.marinmap.org/Html5Viewer/Index.html?viewer=roadmoratorium>). Enforcement of the City's pavement restoration policies are managed by the City's encroachment permit program, which is led by the program coordinator Jason Madayag. We also reviewed the City's "Pavement Restoration Matrix" dated June 30, 2021 which contains the information provided in Table 5 below.

Table 5. City of San Rafael Pavement Restoration Matrix	
Pavement Condition Index (PCI)	Restoration Guidelines
90+	Moratorium Street. Emergency encroachment only. Subject to special conditions and pavement restoration along entire property frontage.
70-90	For roads less than 24 feet wide: Up to full width restoration (when applicable). For roads over 24 feet wide: Restoration to centerline unless repair crosses the centerline then up to a full width restoration is required. Restoration to extend up to 5 feet beyond each side of the trench excavation, including a structural pavement section extending 24 inches outside the limits of the trench excavation per DWG No. 330 ^(a) and DWG No. 380 ^(a)
50-70	Restoration to extend up to 5 feet beyond each side of the trench excavation, including a structural pavement section extending 24 inches outside the limits of the trench excavation per DWG No. 330, 360, 370, and 380 ^(a)
0-50	Restoration to extend minimum 2 feet beyond each side of the trench excavation, per DWG No. 330, 360, 370, and 380 ^(a)
(a) Drawing can be found in the Uniform Construction Standards for All Cities and County of Marin, adopted July 2018	

Reviewing the web application later revealed that much of the South Alignment will require enhanced pavement restoration requirements (i.e., more than a typical "T-cut" or standard trench patch) due to the roads within the project limits having a PCI over 50.

The City reported that their streets are evaluated every 2 to 3 years and, that they will be updating PCIs this fall/winter with an updated report scheduled to be delivered by Spring 2023 as part of the Metropolitan Transportation Commission's (MTC) Pavement Management Technical Assistance Program (P-TAP). This timing suggests that the City's PCIs may decrease during the Project's final design, which could result in slightly less conservative pavement restoration requirements being imposed on the Project.

4.3.3 SMART

SMART was given an overview of the Project and the different locations that were being considered for a new pipeline crossing their tracks. The locations included:

- 4th Street
- 5th Street
- Mission Avenue
- Linden Lane
- Myrtle Avenue

When asked if they preferred any locations to cross their right-of-way, they noted that the potential to use the existing undercrossing at Linden Lane was preferred as it 1) would allow the pipeline to be installed using open-cut methods, 2) would not directly impact their facilities and/or right-of-way, and 3) not require any permits or license agreements. However, if another location ended up being more suitable for the success of the Project, their standard crossing requirements would apply (see Appendix B) and both a right-of-entry permit and a license agreement would be required.

In general, a trenchless crossing will require the water line to be installed in a steel casing spanning the complete width of the SMART right-of-way. SMART acknowledged that they would prefer to limit the number of pipelines crossing their right-of-way, but they also stated that a trenchless crossing of this size and complexity was fairly standard, and they did not express any reservations about the Project.

Once the Project enters the final design phase, it is anticipated that the design team will engage with SMART to discuss the specifics of the planned crossing so that the anticipated schedule can accommodate any submittal reviews and legal approvals required.

4.3.4 State Parks

After receiving an overview of the Project and the three alignments, State Parks representatives expressed concerns, primarily over the North Alternative, but also regarding portions of the Bay Alternative that lie within State Parks jurisdiction. The concerns included the following:

- Potential conflicts between the North Alternative and the future North San Pedro Road Project to raise or alter the route of road to address sea level rise.
- The desire to protect the hydrology of the ancient marsh sediments in this area, which would be impacted by any trenching within the existing roadway.
- The need for new easements.
- That the Project, in their understanding, would primarily be benefitting a golf course (although this was described during the meeting as only being a portion of the realized benefit). Because of this, State Parks would need to consider the overall Project benefits before they would issue an easement.
- Appraisals of the land would be required for any easements that need to be established, and they mentioned that the entire easement establishment process could take a year or more. They also mentioned that they could not guarantee that they would support the Project at all.

A letter was later received by District staff from State Parks District Superintendent, Maria Mowry, dated June 24, 2022 (included as Appendix C), informing the District that State Parks will not be allowing any new pipeline construction on their property or granting any rights related to this Project. Their reasons are described as follows:

- The Project is perceived to require an extensive installation process that will likely impact cultural and natural resources, and that subsequent access, repair, and consideration during emergency events may lead to further resource damage.
- The proposed alignment is thought to pass through or adjacent to numerous significant archaeological/tribal cultural resources that are believed to be extremely sensitive and may be negatively impacted by installation and maintenance of the pipeline.
- While many of the areas proposed for this alignment have already been disturbed for existing roadways or other facilities, much of the infrastructure is thought to have been constructed prior to modern environmental laws or were not subject to what the State believes to be “proper study.” According to the State, disturbance by itself does not preclude areas from containing sensitive archaeological resources or prevent them from holding tribal value and should not necessarily be given consideration as a preferred alignment.
- During installation/construction, the State believes there would be impacts to the marsh hydrology, especially where the tidal channels are located. The State believes these impacts will be long-term since the pipe would be an impermeable barrier in the marsh substrate, assumed to affect subsurface tidal and storm water flows. As such, the State believes this to be an unacceptable level of impact to one of the few remaining ancient marshes present in the San Francisco Bay.
- The State believes that potential significant impacts to endangered species present in the adjacent marsh would likely occur during construction and may occur in future repairs and maintenance.
- The State is concerned about the possibility of a future catastrophic failure of the Project pipeline that could result in a large freshwater flushing of the salt marsh; which, in their minds, has the ability to cause unknown and potentially significant impacts to the flora and fauna of the marsh.

It should be noted that no matter which alignment is constructed, the District and the design team have every intention of complying with all environmental regulations (i.e., administrative, biological, and cultural) to complete the Project in a manner that does not adversely affect the region’s natural beauty, protected species, or sensitive tribal resources without proper mitigation, permits, and approvals.

4.3.5 State Lands Commission

It was noted that there is a possibility that all three alignments may have portions that cross lands owned by the State. The State mentioned that a title search along the alignments was requested on May 2, 2022 and the results were pending as of the day of the meeting.

It was explained that the State does not issue easements, but instead, issues license agreements for 25-year leases that need to be renewed at the end of each term. Typically, there is not an issue with renewing the agreements, but at times, they can be terminated. The State essentially charges “rent” for

use of the land; however, the rent can be waived for beneficial uses. These license agreements typically take 6 months to 1 year to finalize after the project's environmental review is complete.

Panorama eventually heard back from the State in early August, that it was believed that none of the alignments would require a lease.

4.3.6 MCSTOPPP

The meeting began with a presentation by Panorama, which included giving an overview of the project and all three alignments. The Regional Water Board asked questions related to anticipated construction methods, anticipated environmental impacts, timing compared to the County's road project along North San Pedro Road, and total impacts to waters of the State. When Panorama asked if there were any perceived timing differences for permitting between each of the three alignments, the Regional Water Board felt it was hard to say and mentioned they can only issue a permit after CEQA has been complied with, although they mentioned that the pre-application process was likely going to take the longest time.

The County wanted the team to be aware of a baylands restoration project that was taking place near the wastewater treatment plant and the McInnis Golf Center that could interface with the Bay Alignment. Panorama mentioned that they would look into it. The County also felt like BCDC may be the only permitting agency with jurisdiction along the South Alignment (aside from the City and County).

The Army Corps of Engineers (ACOE) mentioned that the South Alignment is the most favorable and the Bay Alignment is the least favorable. ACOE felt that the Bay Alignment is within ACOE's jurisdiction which means it would require a 404B1 alternatives analysis. The initial reaction is that the Bay Alignment would likely be prohibited unless it could be shown that both the North and South Alignments were not feasible or had substantially more impacts.

NOAA National Marine Fisheries mentioned that there were NOAA Trust Resources within the Bay Alignment and it was believed that the project would cause adverse effects to a number of species, and therefore, NOAA could not support the Bay Alignment. However, they went on to describe what steps would be needed should the Bay Alignment somehow be a feasible project. They stated that a consultation with ACOE would be required and that the project would need to look into project alternatives that could avoid a level of "take" of species. In the event that a certain amount of "take" was unavoidable, NOAA would use the terms and conditions of a biological opinion and then ask for mitigation for the elements of "take" that are remaining. It was noted that if ACOE did not claim jurisdiction of the project, that NOAA would not get involved unless they are aware of potential adverse effects that could occur even if the project is not part of the ACOE jurisdiction.

For the North and South Alignments, NOAA wanted to confirm that there are no streams or creeks that have NOAA Trust Species, but he thinks that is probably the case.

4.3.7 BCDC

BCDC provided helpful information related to the permit process and anticipated required approvals for each of the three alignments. It was discussed that their jurisdiction extends to a point around 100 feet from the shoreline. Where tidal marshes exist, the limit of jurisdiction extends to approximately 5 feet in elevation above mean sea level.

There are two types of BCDC permits: Major Permits and Administrative Permits. Major permits are required to go to a public hearing and a vote of the commission, which is then followed by a 90-day issuance timeline. These permits typically require other regulatory agency approvals (as applicable) prior to filing for the permit. An Administrative Permit still requires other regulatory agency approvals and the 90-day issuance timeline but does not require a hearing or a vote. It was explained that the primary determination for whether a project requires a Major versus an Administrative permit is the extent of substantial impacts that the project may have on resources and the public.

BCDC thought the Bay Alignment could have a more streamlined permitting timeline; however, it was also mentioned that the District would need to justify why the North and South Alignments were not feasible before considering the Bay Alignment.

It was mentioned that although North San Pedro Road does not appear to have any permitted access issues, it is planned for a future trail alignment.

The portion of Point San Pedro Road used for the South Alignment was mentioned as being a part of the planned Bay Route Trail alignment and, as such, BCDC would want to see information related to any necessary detours and temporary bike/pedestrian impacts.

When asked whether a Joint Aquatic Resource Permit Application (JARPA) could be used, BCDC said they would accept a JARPA, but acknowledged that it is not the easiest permit to use and mentioned that BCDC would likely have questions in addition to the JARPA. They also mentioned that the California Department of Fish and Wildlife (CDFW) is no longer accepting the JARPA. It was stated that if a JARPA is used, the timing would be such that other regulatory approvals would likely not be available at the time of application submission, which BCDC said was ok as long as those approvals are obtained prior to permit issuance.

It was also mentioned that a marsh restoration project was currently being led by Marin County Parks (likely the same baylands restoration project mentioned at the MCSTOPPP meeting). As part of that project, they were trying to avoid disturbing a sewer force main that runs from the wastewater treatment plant along the eastern border of the McInnis Golf Center, and they thought we should be aware of both the ongoing marsh restoration and the existence of the force main that may extend to North San Pedro Road.

4.3.8 Peacock Gap Golf Club

The meeting with golf club staff was very helpful and centered around questions from the golf club staff about the Project's design considerations as well as discussions related to the club's irrigation facilities.

It was asked if redevelopment of the quarry area had been considered in the sizing of the water pipe. District staff reported that current water use at the quarry had been considered for the pipe sizing, but not future redevelopment demand since it is not currently known what type of redevelopment could occur on the property.

The golf club staff mentioned that the City had created a Facilities Improvement District when the medians and landscaping along Point San Pedro Road were installed. The design team was not aware of this but pledged to reach out to the City to look into the matter.

The District mentioned that the golf club currently has a potable water entitlement of approximately 191 ac-ft per year which equates to roughly \$7M. When asked by the District if they would still need potable water for any of their irrigation once this pipeline was constructed, the golf club staff mentioned

they were open to all possibilities. The District mentioned that the golf club could either pay a hefty recycled water connection fee and keep their potable water rights, or they could sell a portion of their potable rights in lieu of paying the connection fee.

During the conversation, it was mentioned that the golf course is irrigated using two meters: one on Biscayne Drive and the other on Peacock Drive. Until this point, the Project had not been considered to extend down Peacock Drive. However, the golf course mentioned that the meter on Peacock Drive was their primary service point and that it would need to be connected to the recycled water system if the golf course was going to be fully irrigated with recycled water.

The golf club staff also mentioned that all other landscaping near the golf course (i.e., medians, parkways, etc.) was managed by various homeowner's associations (HOAs), and any additional recycled water use for their irrigation would need to be coordinated separately with each HOA.

4.3.9 Caltrans

Despite reaching out to several contacts at Caltrans District 4 over the span of four months, we received no responses to our requests to discuss the Project. Therefore, we were not able to discuss the Project with Caltrans prior to preparing this report. Any crossing of Caltrans right-of-way will be designed based on the design team's similar experience coordinating trenchless crossings across Caltrans facilities. Design drawings will be prepared and submitted as necessary to Caltrans for review in the later stages of final design, and any comments will be incorporated into the final contract documents.

4.3.10 Summary of Stakeholder Coordination Findings

Once all meetings concluded, it was apparent that the Bay Alignment would be extremely challenging (if not impossible) to get permitted if the North and South Alignments are shown to be feasible. Based on the latest letter from State Parks, the North Alignment does not appear to be feasible if the State is not willing to provide access or approvals for the Project. The South Alignment appears to have support from all parties and is the preferred route by the City who has an interest in expanding recycled water usage to other parts of town.

4.4 Geotechnical Desktop Study

A Geotechnical Desktop Study (Study) dated May 31, 2022 was prepared by West Yost's subconsultant, McMillen Jacobs Associates (MMJ) (see Appendix D). The Study included a site reconnaissance field investigation performed by MMJ on May 16th, 2022 to collect geotechnical-related data as well as the review of several available maps, figures, and reports. The Study summarizes their findings and outlines a recommended scope for a geotechnical field investigation for each alignment to be performed prior to final design.

4.4.1 Geotechnical Study Highlights

The study includes a review of urban development, reference borings, geology, geotechnical impacts, and recommended geotechnical field investigations. While the full Study can be reviewed in Appendix D, a summary of key highlights is summarized below.

- Preliminary analysis found that portions of all the alignments are underlain by Young Bay Mud, which is prone to consolidation settlement.

- No Holocene-active faults cross the Project area, and the Hayward Fault and San Andreas Fault are at least 5 miles east of the any of the alignments.
- The Project area is located within a “few landslides” zone consisting of a few large landslides and scattered small landslides in areas underlain by Franciscan Sandstone and Shale, and Franciscan Melange.
- The North Alignment is not anticipated to be subjected to liquefaction induced lateral spreading. Conversely, lateral spreading is a concern for segments of the South and Bay Alignments.

Areas subject to flooding and sea level rise are depicted in figures included in the Study.

4.4.2 Recommended Minimum Geotechnical Field Investigations

The development of the recommended minimum geotechnical field investigations used the following assumptions:

- Borings and/or cone penetration tests (CPTs) are performed on 2,000 feet average spacing along open-cut sections
- Borings and/or CPTs are performed at each trenchless sending and receiving shaft or end point, and along trenchless reaches for horizontal directional drilling (HDD)
- At this time, it is assumed that HDD will not be used for the North Alignment

Table 6 summarizes the recommended minimum geotechnical investigation scopes for each alignment and their approximate associated costs. The costs include subsurface exploration planning and performance (which include drilling and encroachment permit applications), traffic control, physical laboratory testing of soil and bedrock samples, and the analysis and preparation of a geotechnical-related recommendations report for design of the Project. It is likely that specialty permit applications will likely be required to perform borings and CPTs along portions of the Bay and North Alignments and are not included in the current cost estimate.

Table 6. Design Geotechnical Investigation Scope and Minimum Cost			
Alignment	Borings/CPTs	Geophysical Surveys	Cost Estimate, minimum, \$
South	24	9-12 (seismic refraction)	300,000
North	15	6-8 (seismic refraction)	200,000 ^(a)
Bay	14	6-8 (seismic refraction & marine surveys)	400,000 ^(a)
(a) Does not include specialty permit applications for subsurface explorations in China Camp State Park and in San Pablo Bay.			

4.4.3 Geotechnical Conclusions

The Study concludes that the North Alignment is preferred when solely considering geotechnical design constraints. Unfortunately, while there appear to be no geotechnical fatal flaws along the Bay Alignment, the cost and technical challenges of designing and constructing the pipeline along this alignment are

economically impractical and make the Bay Alignment not recommended from a geotechnical point of view. The South Alignment is noted as scoring lower than the North Alignment due to significant unknowns (e.g., the location and backfill types of existing utilities) and the potential for encountering naturally occurring asbestos in project excavations along the South Alignment. Tables 5, 6, and 7 of the Study in Appendix D summarize the geotechnical comparison of the different alternatives.

4.5 Environmental Document Review

West Yost subcontracted with Panorama to review environmental and permitting considerations for the three alternatives. Their findings were documented in the report titled “Marin Municipal Water District Peacock Gap Alternative Evaluation – Environmental and Permitting Considerations,” dated June 2022, and is provided in Appendix E. The report details key environmental and permitting concerns for each alternative including approximate costs and schedules to fulfill all California’s Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA) requirements, as applicable.

4.5.1 South Alignment

Biological resource impacts for this alignment are limited to potential California red-legged frog territory near the Peacock Gap Golf Course where the pipeline extends from Biscayne Drive to the existing water tank. This could be mitigated through measures put into place to avoid impacts on the frogs and thus avoid the need for federal or state Endangered Species Act (ESA) permitting. It should also be noted that this potential impact is along a pipeline segment that is common to all three alternatives. There is potential for rare plants to be impacted, but surveys could likely be avoided if they were to be found.

The main impacts of concern for the South Alignment are related to traffic, noise and air quality impacts from construction due to the close proximity of the alignment to residences and other sensitive resources.

Permits for the South alignment include a BCDC permit, encroachment permits, and possible regulatory permits related to domestic water separation requirements.

No cultural impacts are anticipated for the South Alignment.

4.5.2 North Alignment

The North Alignment travels primarily under North San Pedro Road, much of which is located within China Camp State Park. Much of North San Pedro Road is close to marshes and within areas of potential cultural deposits.

Biological resource impacts for this alignment include the possibility of impacts to several sensitive state and federally listed species in the marshes adjacent to North San Pedro Road such as the salt marsh harvest mouse, California clapper rail and the California red-legged frog. Construction could also impact sensitive soils of rare marshes and jurisdictional waters of the United States.

The main concern for this alignment alternative is the potential conflict with a larger planning effort that is underway through the China Camp San Francisco Bay National Estuarine Research Reserve (NERR). NERR is working to address low-lying portions of North San Pedro Road to preserve and restore sensitive marsh habitats and hydrology, which could include raising or re-aligning the road. These efforts are on a longer schedule than this Project and could impact or delay the issuance of an easement and right-of-entry by California State Parks by two or more years.

Permitting for this alignment includes resource permits for impacted species under the state and federal ESA and California Department of Fish and Wildlife Fish and Game Code for streambed alterations. Soil and jurisdictional water impacts could require Section 404 Nationwide permits from the United States ACOE (USACE). Other permits include BDCD, encroachment, and regulatory permits.

Cultural impacts are of great concern for this alignment alternative. There is potential to encounter buried Native American cultural deposits, and if found, would require expensive and time-consuming subsurface borings, consultations, and mitigation. Stakeholders are extremely sensitive about potential impacts to these resources and could add time to the environmental review process. Road closures of North San Pedro Road, due to construction, could impact traffic and access to recreation and Native American sites.

4.5.3 Bay Alignment

The Bay Alignment is the shortest alternative but is located almost entirely within San Pablo Bay. The on-shore portions of the alignment would be trenched or could be installed via trenchless methods to avoid conflicts in wetland areas.

Biological resource impacts for this alignment are primarily aquatic and estuarine. Animals and plants that may be affected include the salt marsh harvest mouse, California clapper rail, California least tern, California seablite, Tiburon jewelflower, white-rayed pentacheata and fish species in the Bay and San Rafael Creek. Additional impacts could be to McInnis Marsh and would need coordination with Marin County Parks.

Permitting requirements include state and federal ESA permits for both terrestrial and aquatic species, Section 10 and 404 permits, State Lands Commission and BCDC permits, encroachment, and regulatory permits. The project could also require an Individual Permit from USACE which could take a year or longer to complete and would require a Least Environmentally Damaging Proposed Action (LEDPA) analysis. This permit could be denied if other alternatives exist with less environmental effects.

Impacts to traffic, air quality, and noise would be reduced compared to the other alternatives.

4.5.4 Cost and Schedule Summary

A summary of the estimated costs and schedules for environmental compliance and permitting work for each alternative is summarized in Table 7 below.

Table 7. Estimated CEQA Cost and Schedule Comparison					
Alignment	CEQA Studies, \$	CEQA/NEPA Document, \$	Permitting, \$	Total Cost, \$	Permitting Schedule
South	180,000	150,000	300,000	380,000	11 months
North	475,000	225,000	200,000 ^(a)	800,000	17 months ^(a)
Bay	155,000	230,000	400,000 ^(a)	560,000	17 months
(a) NERR efforts to address issues with North San Pedro Road may impact this schedule.					

4.6 Field Alignment Review

A site visit was performed on May 10th and 11th, 2022 by three members of West Yost. The purpose of the visit was to review the entirety of the three proposed alignments, more specifically as follows:

- Review the existing utility base map against utility features visible from the surface,
- Identify any evidence of existing utilities or other constraints that were not previously identified within the project area,
- Gain an understanding for daily traffic volumes and potential resident/business impacts, and
- Seek to review any sub-alternatives that may exist along the South Alignment.

Notable findings from the site visit are included in Section 6.0 below.

4.7 Traffic Considerations

West Yost subcontracted with W-Trans to gain insight related to traffic considerations based on their local experience for each of the three alignments. As there are no signalized intersections or major traffic implications along the North or Bay Alignments, their thoughts are focused primarily on the South Alignment, and are summarized below.

4.7.1 Traffic Signal Loops

The following are four (4) signalized intersections that will be impacted by construction for the South Alignment:

- Lincoln Avenue at US 101 On/Off Ramps
- Lincoln Avenue at Linden Lane
- 3rd Street at Union Street
- Point San Pedro Road at Loch Lomond Drive

If signal loops are cut or damaged while trenching through a signalized intersection, the City could potentially put that approach or movement on recall, which is not particularly efficient, but should be adequate for a short duration. The loops would then need to be reinstalled as soon as possible.

If the City prefers cameras to loops, the cost to install cameras can be equivalent to repairing the loops, especially if the trench goes down the lane closest to the curb and damages the lead-in cables for multiple lanes. Installing cameras would also allow the City to change the detection zone so that it can pick up traffic in the remaining travel lane on a multi-lane approach, even if the traffic is shifted due to pipeline construction, while leaving activity in the construction zone un-detected. As such, traffic camera installation could be performed proactively prior to pipeline construction to limit the eventual disruption to signal operations.

4.7.2 Pedestrian, Biking and Transit Access

If the Project impacts existing sidewalks, bike lanes, or transit stops, CEQA requires an alternate path, route, or stop to be identified and indicated to users during construction. Because there are transit stops in the Project area, coordination with transit providers will be required.

4.7.3 Safety

CEQA requires adequate lane transitions and other traffic control measures to ensure public safety. As such, it is anticipated that the final construction documents would provide parameters to the contractor such as acceptable work hours and minimum lane widths, which would be used by the contractor to develop traffic control plans that would be submitted to the City/County prior to construction for encroachment permit approval.

5.0 EVALUATION CRITERIA

Using all data and information gathered as described in Section 4.0 above, the design team collaborated with District staff to develop a set of objective evaluation criteria that could be used to compare the alternatives. Each criteria was then assigned a weight to ensure that it was scored in accordance with District priorities. The final criteria and weightings were reviewed and approved by the District before being assigned scores by the design team and are summarized in Table 8 below.

Table 8. Evaluation Criteria			
Evaluation Criteria	Criteria Objective	Basis for Scoring	Weight
District Interest & Considerations			
Ease of Maintenance ^(a)	Identify any complications to maintaining the pipeline using traditional equipment/staff	Alternatives requiring specialized equipment, staff, or permissions will receive a lower score	8%
Coordination with Other Projects	Identify items requiring coordination with projects being led by other agencies	Alternatives requiring lesser amounts of coordination will receive a higher score	1%
Beneficial Use	Identify areas along the proposed routes that would be most likely to receive recycled water into the future	Alternatives providing recycled water to more properties/agencies interested in using recycled water will receive a higher score	10%
Easements, Land Acquisition, and Agreements ^(a)	Identify areas where the acquisition of new easements/land or the processing of use agreements may be required	Alternatives requiring new easements/land acquisitions or use agreements will be given a lower score	6%
Subtotal			25%
Design Considerations			
Topographic Survey Effort ^(a)	Identify the level of topographic survey requirements for each alternative	Alternatives requiring a lesser level of topographic survey efforts will receive a higher score	1%
Geotechnical Field Investigations ^(a)	Identify the level of geotechnical field investigation work required to design each alternative	Alternatives requiring a lesser level of geotechnical field investigations for design will receive a higher score	1%
Utility Congestion ^(a)	Evaluate the level of coordination with, and locating/potholing of, existing utilities for each alternative	Alternatives to be constructed in corridors with lesser utility congestion will receive a higher score	3%
Trenchless Design Complexity ^(a)	Identify the level of effort required for trenchless design for each alternative	Alternatives requiring more effort during design for trenchless components will receive a lower score	4%
Subtotal			9%
Constructability Considerations			
Pavement Restoration ^(a)	Identify approximate pavement restoration requirements for each alternative.	Alternatives requiring a lesser level of pavement restoration will receive a higher score (i.e. lower PCI)	4%
Geotechnical Considerations ^(a)	Identify geotechnical conditions and potential impacts to each alternative design	Alternatives which are less likely to be impacted by geotechnical considerations will receive higher scores	4%
Trenchless Installation ^(a)	Identify methods and extents of trenchless construction as well as how many trenchless crossings are required for each alternative and the associated risk for this work	Alternative designs which have fewer trenchless crossings or trenchless construction with lower risk for potential conflict will receive higher scores	4%
Construction Access and Site Constraints ^(a)	Identify the level of construction accessibility and site constraints for each alignment	Alternatives which provide greater construction access will receive higher scores	4%
Subtotal			16%
Public Impacts			
Traffic Impacts	Identify potential impacts to traffic for each alternative	Alternatives with lesser potential negative impacts on traffic will receive higher scores	3%
Noise / Dust During Construction	Identify the potential for noise or dust complaints during construction along each alternative	Alternatives with lesser potential for noise, odor, or dust complaints during construction will receive a higher score	2%
Subtotal			5%
Environmental Considerations			
CEQA Documentation ^(a)	Identify level of CEQA document (EIR vs IS/MND) as well as overall review/processing time required	Alternatives that qualify for IS/MND will receive higher score than alternatives that are likely to require an EIR	3%
NEPA Documentation ^(a)	Identify level of NEPA document (None, EA, or EIS)+B27:C36C27B27:C34A27:D38B27:C36B27:C35B27:C34B27:C35B27:C36	Alternatives that require no NEPA score the highest Alternatives requiring EA-level review will receive a mid-level score Alternatives requiring an EIS will receive the lowest score	4%
Biological Resources Impacts	Identify potential impacts to biological resources (wetlands, listed species, special habitats) for each alternative	Alternatives with lesser potential negative impacts on biological resources will receive a higher score	3%
Cultural Resources Impacts	Identify potential impacts to cultural resources and tribal cultural resources for each alternative	Alternatives with lesser potential negative impacts on cultural resources will receive a higher score	3%
Compensatory Mitigation ^(a)	Identify if compensatory mitigation is needed based on type of impact	Alternatives with greater potential compensatory mitigation costs will receive a lower score	3%
Water Permits (10, 404, 401, 1600, BCDC) ^(a)	Identify permitting triggers for each alternative	Alternatives that avoid water permits score the highest Alternatives that qualify for Army Corps Nationwide Permits score higher than alternatives that require an individual permit BCDC permitting needs are also included	3%
Species Permits ^(a)	Identify if species take permits are required for each alternative	Alternatives that avoid take permits receive a higher score than alternatives that require take of one or more species	3%
Number of responsible agencies	Identify how many other agencies must participate in the CEQA review due to having a discretionary action to permit	Fewest responsible agencies will score highest; most responsible agencies will score lowest	3%
Subtotal			25%
Overall Project Cost			
Overall Project Cost	Identify overall project cost for each alternative including soft costs	Alternatives which have a lower overall project cost will receive higher scores	20%
TOTAL			100%
(a) Identifies an Evaluation Criteria as a Cost Related Criteria. Cost Related Criteria are already included as part of the construction cost estimate, therefore the Cost Related Criteria in these instances are being evaluated based on other attributes such as overall risk, schedule impacts, and constructability, etc.			

6.0 ALIGNMENT ALTERNATIVES ANALYSIS

The following section summarizes key aspects of each of the alternatives that provided a basis for the scoring. The segments common to all alignments were included in the overall alignment lengths and costs but were not included in the analysis of other evaluation criteria since they're the same for all three alignments. A thorough review of all data and information was performed prior to assigning a score to each of the design criteria.

6.1 South Alignment

The South Alignment is the longest of the three alternatives (approximately 46,000 feet) extending from the end of Merrydale Road to the Peacock Gap Golf Club. The alignment primarily consists of existing paved roadways serving varying traffic volumes. Much of the alignment is located along Point San Pedro Road which largely follows the edge of San Rafael Bay. Compared to the other two alignments, this alignment passes through the most residential and commercial areas and will likely present the most public impacts for residents and business owners.

6.1.1 Site Visit Highlights

The alignment begins at Merrydale Road where it will connect to an existing recycled water line marked by a blow-off that exists at the end of the existing pipeline which has been installed off the road pavement. The alignment then heads south along the existing bike path adjacent to Highway 101 (US 101) where easements are anticipated to be required and some Caltrans coordination may also be warranted due to the proximity of the pipeline to the State right-of-way. The pipeline then enters Lincoln Avenue and crosses the existing SMART tunnel before reaching the first signalized intersection, which according to SMART personnel, should not be an issue based on the known depth of the tunnel roof compared to the existing road surface.



South Alignment's connection to the existing recycled water system on the north side of Merrydale Road south of North San Pedro Road.



South Alignment's connection to the existing recycled water system on the north side of Merrydale Road south of North San Pedro Road looking north.

Peacock Gap Recycled Water Transmission Pipeline



Bike path alongside US 101 looking southeast towards Lincoln Avenue.

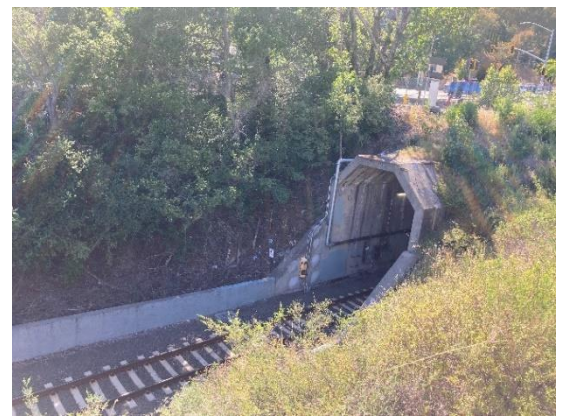


Bike path alongside US 101 looking northwest towards Merrydale Road.

The alignment continues south on Lincoln Avenue across the intersection with Hammondale Court and the US 101 on- and off-ramps. This intersection is controlled by Caltrans and will likely require Caltrans coordination and permitting to install the pipeline by open-cut construction. At this intersection, the SMART tunnel beneath Lincoln Avenue can be seen to the east.



Aerial view of SMART Tunnel, bike path tunnel, US 101 on and off-ramps at intersection of Lincoln Avenue and Hammondale Court.



Looking north at the SMART train tunnel under the US 101 on- and off-ramps near the intersection of Hammondale Court and Lincoln Avenue.

From the Caltrans intersection, the alignment continues south in Lincoln Avenue, which is a narrow two-lane street with heavy utility congestion and high traffic volumes. According to the utility maps provided, there is a gas main with a diameter ranging from 16 to 20 inches and two large AT&T duct banks. Although it would be a challenging street to work in, the initial analysis performed suggests it is feasible to install a new 12-inch diameter pipeline in this segment of Lincoln Avenue.

When the alignment reaches Linden Lane, it heads northeast and crosses below US 101 and the existing SMART tracks by way of an existing vehicular underpass. Based on the cracks in the asphalt roadway

surface, it appears that Linden Lane could be constructed of concrete pavement beneath an asphalt overlay. This would be investigated during the geotechnical investigation to provide appropriate information to potential bidders. Due to the space available, it is also anticipated that installing the pipeline in the undercrossing would require a full road closure and detour to provide sufficient space for the contractor to complete the improvements.



Looking southwest along Linden Lane towards US 101.



Looking southwest along the Linden Lane undercrossing.

Once on the east side of US 101, the alignment heads southeast in Grand Avenue and Mission Avenue through mostly residential areas, passing by Dominican University of California, through mild utility congestion and traffic. The alignment then leaves Mission Avenue and heads south on Union Street towards 3rd Street, entering a more commercial environment with higher traffic volumes. Fire Station 72 is located on Union Street between 3rd Street and 4th Street, which will require the contractor to work closely with the City of San Rafael to ensure that access in and out of the fire department can be maintained throughout construction. Construction within the intersection of 3rd Street and Union Street may be best performed during evening hours due to the heavy traffic volumes that use this intersection daily. The alignment then heads east on 3rd Street which quickly becomes Point San Pedro Road as it passes by San Rafael High School.

Much of Point San Pedro Road has two travel lanes in either direction separated by a median. In some cases, the westbound lanes have been built at a significantly higher elevation than the eastbound lanes requiring a retaining wall to separate the two sides of the road. There are also areas of heavy utility congestion including water lines, gas lines, storm drain lines, sewer gravity lines, force mains, electrical lines, and telecommunication lines. The areas with the most utility congestion in this stretch are surrounding the intersections of Point San Pedro Road and Margarita Drive, Manderly Road, Loch Lomond Drive, Bayview Drive, and McNear Brickyard Road. It will be necessary to locate all the existing utilities in this area, especially the sewer force mains, during final design to confirm available utility corridors for the new recycled water line as well as provide the contractor with an accurate existing utility base map to assist with limiting change orders and construction delays.

At the intersection of Manderly Road and Point San Pedro Road near San Pedro Elementary School, there is an underground pedestrian crossing underneath Point San Pedro Road. Information regarding this underground pedestrian crossing was found on District as-builts and will need to be incorporated into the final design. Photos taken during the site visit are included below.



Northern entrance to underground pedestrian crossing to San Pedro Elementary School at Manderly Road under Point San Pedro Road.



Northern entrance to San Pedro Elementary School underground pedestrian crossing. Person is approximately 6 feet tall for reference.

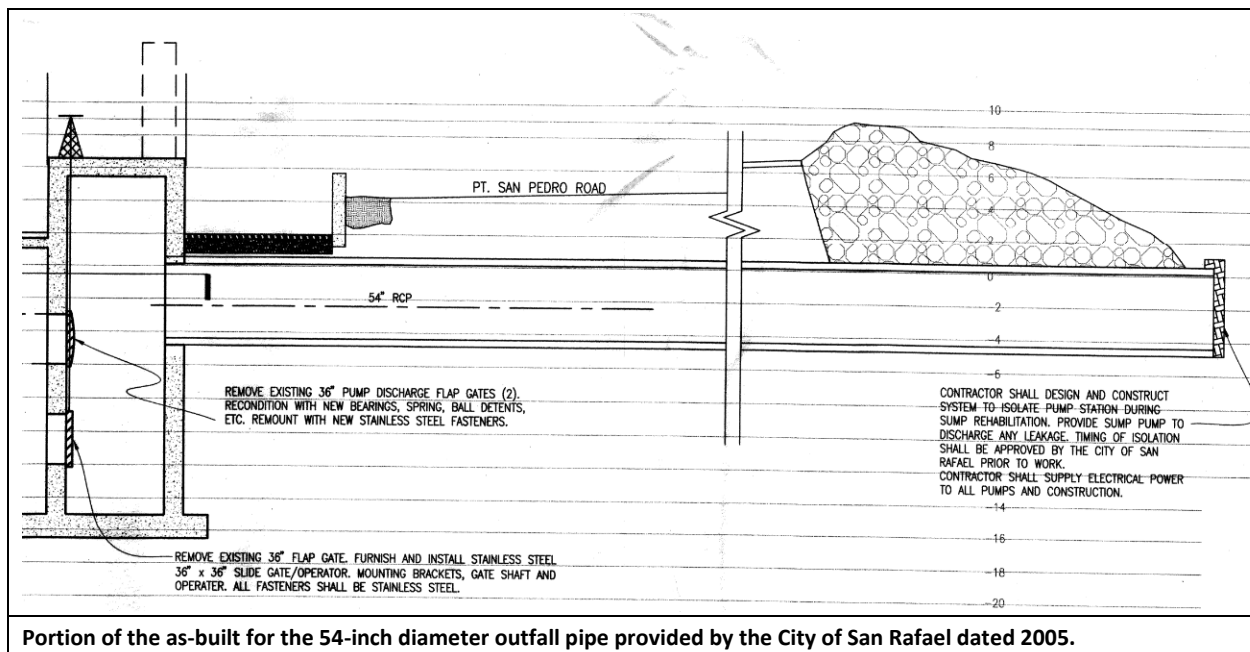


San Pedro Elementary School underground pedestrian crossing.

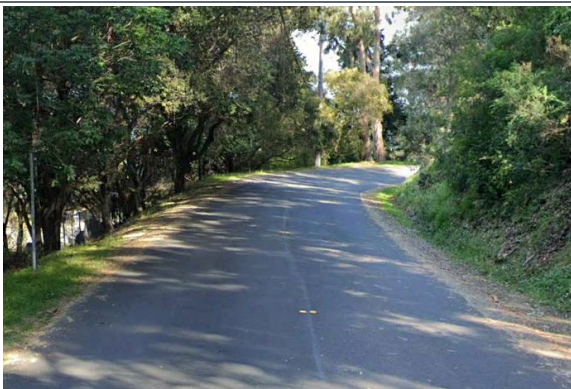


Southern entrance to San Pedro Elementary School underground pedestrian crossing.

The presence of a stormwater pump station was noted during the site visit between Peacock Drive and Riviera Drive. This stormwater pump station is operated by the City and controls flows in and out of the pond at the south end of the golf course. According to as-builts obtained from the City, the pump station has a 54-inch diameter outflow pipe installed beneath Point San Pedro Road that will need to be avoided during the installation of the new pipe. Due to the limited cover over the pipe, a trenchless installation may be required to install the recycled water pipe beneath the 54-inch outfall (see Appendix F for additional information).



A unique feature of this alignment is that it includes a branch line to be installed in Cantera Way to bring a recycled water connection to McNears Beach County Park. Cantera Way is a narrow, mildly steep, two-lane road with a dirt shoulder in some portions. McNears Beach County Park is a shoreside park with a swimming pool and tennis courts.



Looking east along Cantera Road towards McNears Beach County Park.



Entrance to McNears Beach County Park.

6.1.2 Alignment Sub-Alternatives

The following route alternatives were reviewed to try and avoid heavy traffic areas, reduce the complexity of the US 101/SMART crossing(s), and/or limit the amount of construction in heavily congested utility corridors:

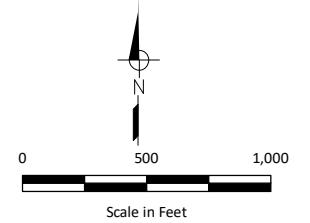
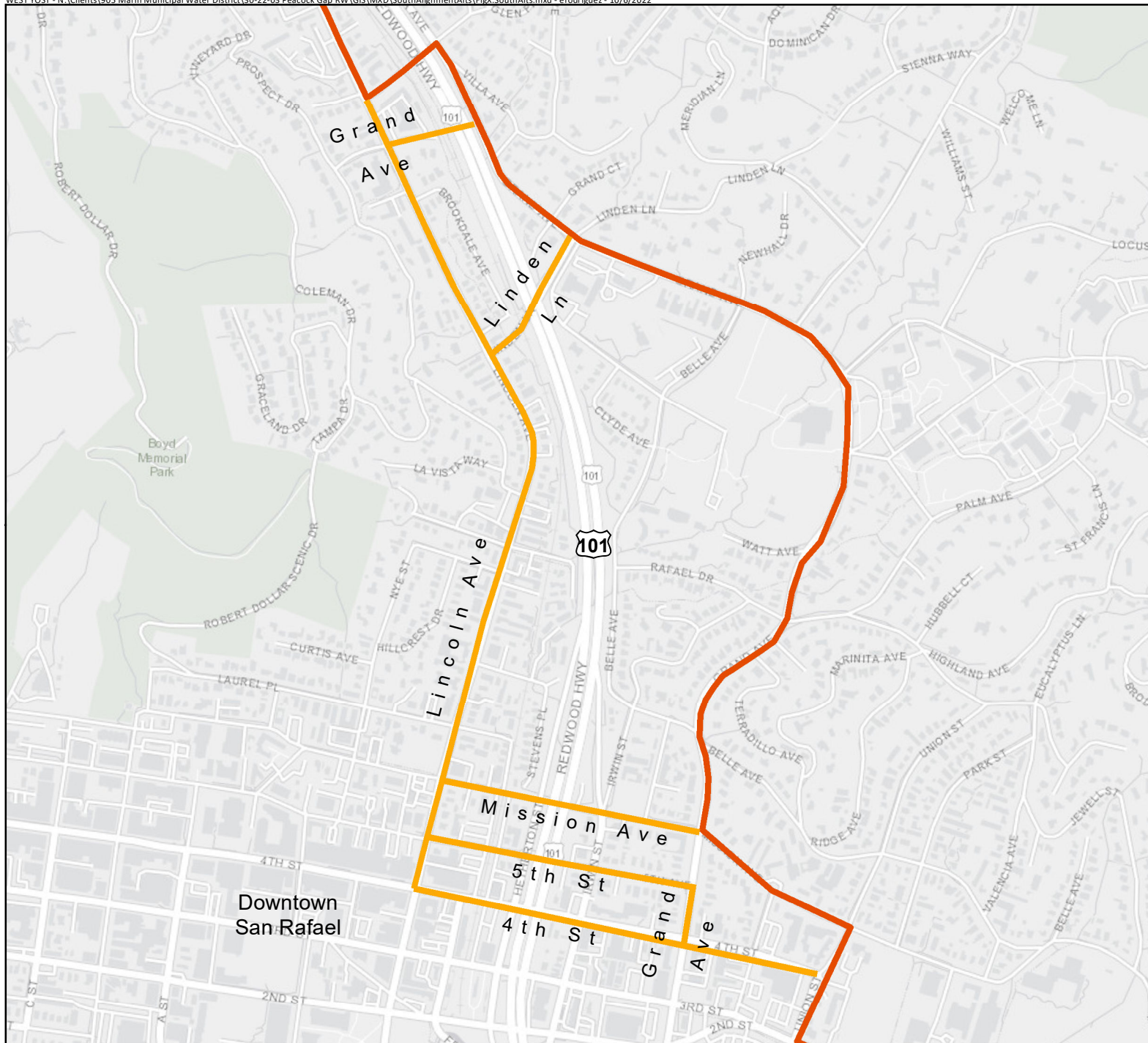
- Marina Boulevard and East Mission Avenue to avoid the 3rd Street / Union Street Intersection
- Crossing US 101/SMART at Myrtle Avenue

- Crossing US 101/SMART at 4th Street
- Crossing US 101/SMART at 5th Street
- Crossing US 101/SMART at Mission Street
- Crossing US 101/SMART at Grand Avenue

These locations are illustrated in Figure 5 below.

6.1.2.1 Marina Boulevard and East Mission Avenue

Due to the heavy traffic volumes in the vicinity of the intersection of 3rd Street and Union Street, Marina Boulevard and East Mission Avenue were reviewed to see if they could be a viable alternative route between Point San Pedro Road and Grand Avenue. However, construction in these narrow residential streets would cause more direct impacts to the local residents, and a review of existing utility maps indicates that East Mission Drive already has two domestic water lines installed in the roadway. Additionally, since the City is not overly concerned about traffic impacts, this alternative would not provide an overwhelming benefit when compared to the planned route along 3rd Street and Union Street. Therefore, this sub-alternative was excluded from further consideration.



- South Alignment
- South Alignment Alternatives



Figure 5
Peacock Gap RW Pipeline
South Alignment
Alternatives

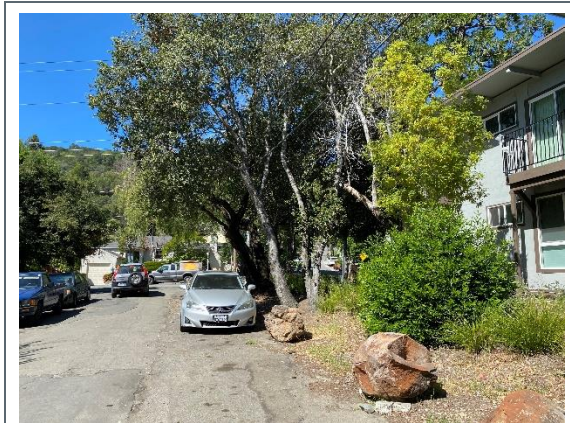
Marin Municipal Water District
Peacock Gap
Recycled Water (RW) Project

6.1.2.2 Myrtle Avenue Crossing

The RFP indicated that the South Alignment was intended to cross US 101 and the SMART tracks at Myrtle Avenue. This crossing was evaluated during the site visit as well as described in the trenchless evaluation memo included in Appendix F. There are two segments of Myrtle Avenue, one on either side of US 101 and the SMART tracks. It was observed during the site visit that the westerly segment of Myrtle Avenue is the only ingress/egress route for an apartment complex located adjacent to the SMART tracks. As such, the equipment area and staging area required to install a trenchless pipeline installation beneath US 101 and SMART would likely cause much disturbance to the residents of that complex and restrict the amount of space available to the contractor to perform the work. Similarly, the east side of the crossing has the potential to greatly affect circulation on Grand Avenue and may require a full road closure. This crossing would also require permits and agreements from Caltrans and SMART, both of which would not be required if the Linden Lane route was used. Therefore, this route is a viable option, but is considered to be less suitable for the Project than using the Linden Lane crossing location.



Myrtle Avenue on the west side of Highway 101 looking towards the railroad tracks and US 101.



Myrtle Avenue on the west side of US 101 looking towards Lincoln Avenue. Myrtle Avenue is a narrow, congested area with dense apartments and hotels on either side.

6.1.2.3 4th Street, 5th Street, and Mission Street Crossings

As described above, the RFP indicated that the South Alignment was planned to cross US 101 and the SMART tracks at Myrtle Avenue via a new trenchless installation. The crossing would require an installation in excess of 300 feet and, as mentioned earlier, would require permits and agreements from Caltrans and SMART while creating significant disturbances to local residents at each end of the crossing. As such, the team reviewed the possibility of crossing US 101 at 4th Street, 5th Street, or Mission Street where the freeway is elevated above the city streets, which would allow the contractor to install the pipeline via traditional open-cut construction and avoid interacting with Caltrans for permits. The SMART tracks in this area are not elevated and would still require a trenchless installation across the SMART right-of-way, but this crossing would be much shorter and could be performed using a simpler auger bore and jack method rather than the more complicated microtunneling method that would be required at Myrtle Avenue due to the length of crossing required. An added benefit to these crossing locations would help the City achieve their goal of getting recycled water closer to downtown.

However, while the crossings themselves may be simplified at these locations, the review of these crossings produced several challenges. First, once the pipeline reaches the west side of the SMART tracks, the pipeline would need to be installed in Lincoln Avenue which is a heavily congested utility corridor and is fairly narrow in terms of available work area. Secondly, crossing US 101 and SMART in this area would fail to bring recycled water close to the potential large customers of Dominican University, Trinity Church, and the Conlan Recreation Center among other single and multi-family residential customers. Additionally, these streets cross culverts that facilitate the flow of drainage down an existing open channel beneath the freeway, which would need to be mitigated, and could mean that a trenchless installation may be unavoidable. This segment of Mission Avenue also traverses two Caltrans intersections at the on-off ramp locations which would not remove the need to coordinate with Caltrans for permits. Also, as mentioned above, the Linden Lane crossing does not require a trenchless installation or permits/agreements, which makes it a preferred crossing location compared to these sub-alternatives.

For all these reasons, these crossings were eliminated from consideration.



A stream crosses under the US 101 overpasses as it crosses through Downtown San Rafael.



SMART double train tracks crossing 4th Street.

6.1.2.4 Grand Avenue Crossing

Similar to the Myrtle Avenue crossing described above, there are two segments of Grand Avenue, one on each side of US 101. While the available work area at the Myrtle Avenue crossing location is somewhat constrained, a crossing at Grand Avenue may provide more room for the contractor to work while also creating less impacts for local resident circulation as the apartment complex to the north of the crossing has more than one entry/exit location. It would also reduce the length of pipeline required to be installed in Lincoln Avenue when compared to the Linden Lane alternative.

That said, so long as the Linden Lane crossing is viable, the crossing at Grand Avenue would still require a specialty trenchless installation and Caltrans/SMART permits/agreements. As such, the Linden Lane crossing is preferred over this location.

6.1.3 Design Considerations

When looking at the South Alignment using Linden Lane to cross US 101 and SMART, the following factors were considered while scoring this alternative.

6.1.3.1 Unfavorable Considerations

The South Alignment is the longest alignment and would require the highest capital cost to design and install. One of the highest construction cost items would be the need to restore pavement in accordance with City and County requirements, which would likely require more than a simple trench patch. Due to the existing traffic volumes at various segments of this alignment, it would also create the largest traffic impacts during construction. As such, some night work may be required which also increases installation costs. Segments within high utility congestion areas will also make the pipeline challenging to design and install while providing reasonable separations from other existing utilities.

6.1.3.2 Favorable Considerations

Because the pipeline would be installed in existing public roadways and easements, it is anticipated that no new easements or right-of-way acquisition would be required for this alternative. For this same reason, it is anticipated that this alternative would also require the least amount of paperwork, studies, and time related to CEQA compliance, and would allow District maintenance staff to maintain and repair the pipelines as necessary using standard equipment and practices. Although the South Alignment may be the most expensive option, it is relatively comparable to the North Alignment on a cost per acre-foot basis because of the large amount of potential customers that this alignment may service in the future. Additionally, this alignment has potential for future expansion west into downtown San Rafael. A 2.4-mile spur along 5th Avenue can connect to six additional irrigation services including the City of San Rafael, Marin Academy and Mt. Tamalpais Cemetery. The additional services would combine to an estimated 16 acre-feet per year demand offset. All future high density buildings along the spur would be required to be dual plumbed and use recycled water for applicable applications.

6.1.4 Scoring

A final detailed scoring breakdown of the South Alignment has been provided in Table 9.

Table 9. South Alignment Weighted Scoring				
Evaluation Criteria	Notes	Weight	Rating (1=worst, 5=best)	Score
District Interest & Considerations				
Ease of Maintenance(a)	Alignment is within public right of way and no special equipment required	8%	5	0.40
Coordination with Other Projects	Coordination with paving projects, and any active utility construction/relocation projects	1%	4	0.04
Beneficial Use	Possible beneficial use expansion to schools, parks, industries, and residential customers. Provides recycled water to downtown area	10%	5	0.50
Easements, Land Acquisition, and Agreements(a)		6%	4	0.24
Subtotal		25%	18	1.18
Design Considerations				
Topographic Survey Effort(a)	Large survey effort, heavy traffic control required	1%	3	0.03
Geotechnical Field Investigations(a)	Large geotechnical investigation effort	1%	3	0.03
Utility Congestion(a)	Moderate utility congestion expected along the length of the alignment with some areas of heavy utility congestion	3%	1	0.03
Trenchless Design Complexity(a)	Coordination with existing utilities, steel casing and vertical separation requirements	4%	3	0.12
Subtotal		9%	10	0.21
Constructability Considerations				
Pavement Restoration(a)	More pavement restoration required compared to North Alignment (PCI range 70-90)	4%	1	0.04
Geotechnical Considerations(a)	Multiple unknowns and potential for naturally occurring asbestos	4%	3	0.12
Trenchless Installation(a)	Trenchless crossings at Hwy 101 and large diameter storm drain expected along alignment (Depending on South Alternative additional trenchless crossings may be required)	4%	4	0.16
Construction Access and Site Constraints(a)		4%	3	0.12
Subtotal		16%	11	0.44
Public Impacts				
Traffic Impacts		3%	1	0.03
Noise / Dust During Construction	Majority of the alignment passes through or nearby residential areas	2%	1	0.02
Subtotal		5%	2	0.05
Environmental Considerations				
CEQA Documentation(a)	An Initial Study/Mitigated Negative Declaration is anticipated to be the appropriate CEQA document. If the project uses funds from the Clean Water State Revolving Fund (SRF) program, then the CEQA document would be required to meet SRF CEQA-Plus requirements	3%	5	0.15
NEPA Documentation(a)	No NEPA documentation is anticipated	4%	5	0.20
Biological Resources Impacts	Impacts to biological resources are anticipated to be minimal because trenching activities would occur predominantly in developed and disturbed areas. Potentially significant biological resources could be mitigated to a less than significant level	3%	4	0.12
Cultural Resources Impacts	Impacts to cultural resources are anticipated to be minimal because trenching activities would occur predominantly in developed and disturbed areas. Potentially significant cultural resources could be mitigated to a less than significant level	3%	4	0.12
Compensatory Mitigation(a)	No compensatory mitigation is anticipated	3%	5	0.15
Water Permits (10, 404, 401, 1600, BCDC)(a)	Drainages and culverts may be affected by construction within road to install the pipeline. Required permits are anticipated to include 404, 401, 1600. Work within 100 feet of the Bay will require a minor permit from BCDC. Permitting is anticipated to be straightforward	3%	4	0.12
Species Permits(a)	No incidental take permits are anticipated	3%	5	0.15
Number of responsible agencies	Considerable coordination with resource agencies and local jurisdictions would be required due to overlapping jurisdiction. Agency coordination is anticipated to be relatively straightforward since impacts of the alternative would be relatively minor	3%	4	0.12
Subtotal		25%	36	1.13
Overall Project Cost				
Overall Project Cost	Highest estimated overall project cost	20%	1	0.20
TOTALS		100%	78.00	3.21
(a) Identifies an Evaluation Criteria as a Cost Related Criteria. Cost Related Criteria are already included as part of the construction cost estimate, therefore the Cost Related Criteria in these instances are being evaluated based on other attributes such as overall risk, schedule impacts, and constructability, etc.				

6.2 North Alignment

The North Alignment is the next longest of the three alternatives (approximately 30,000 feet) extending from the intersection of Schmidt Lane and North San Pedro Road to the Peacock Gap Golf Club. The alignment consists of existing paved County roadways serving very light traffic volumes until it enters and crosses China Camp State Park before reaching Biscayne Drive. Much of the alignment is located along North San Pedro Road which largely follows the edge of San Pablo Bay. Although this alignment does not pass through areas as congested as the South Alignment, there are several environmental, cultural, permitting, scheduling, and access concerns related to this alignment.

6.2.1 Site Visit Highlights

The North Alignment begins at the existing recycled water system at the intersection of Schmidt Lane and North San Pedro Road. Between Schmidt Lane and La Pasada Way, planted median islands are present in the middle of North San Pedro Road which would make construction challenging while also trying to maintain 2-way traffic for local residents, which may require partial to full road closures. There is also mild utility congestion within the roadway.



North San Pedro Road transitions to mostly residential areas after Sunny Oaks Drive. The road is two-lane and has an intermittent shoulder.



North San Pedro Road west of La Pasada Way has planted median islands that would restrict contractor access and work areas while maintaining acceptable circulation.

At the intersection of North San Pedro Road and Sunny Oaks Drive, the mild utility congestion ends as the road moves closer to the edge of the bay marsh. As this part of the road begins to leave traditional residential neighborhoods, the road transitions to provide more work area for potential construction crews and traffic control.

The alignment then continues down North San Pedro Road heading southeast along the edge of San Pablo Bay. The section of North San Pedro Road between Sunny Oaks Drive and the China Camp State Park Visitor Center is a narrow 2-lane road with minimal utilities installed in the roadway. The road has several curves and travels along the shore of the San Francisco Bay National Estuarine Research Reserve. The road's elevation closely follows the adjacent marsh lands and tidal flows which generates concerns about the possibility of climate change and sea level rise eventually inundating this road in it's current configuration. This concern has caused the County to look at possible alternatives to raise the roadway or relocate it further up the adjacent hillside.



Along the San Francisco Bay National Estuarine Research Reserve, the road and the marsh are very similar elevation.



Portion of the North Alignment traverses North San Pedro Road in a mostly natural landscape area along marsh around China Camp State Park.

This stretch of roadway also traverses several culverts installed below the roadway to facilitate drainage and tidal flows. Most of the culverts are shallow and cross the road with about 2 feet or less of cover.





Culvert crossing under North San Pedro Road.



Culvert crossing is very shallow under North San Pedro Road.

The alignment then leaves North San Pedro Road and travels south through China Camp State Park past the visitor center and guard house before reaching Biscayne Drive.

	
<p>China Camp Back Ranch Meadows Campground Entrance on the inland (southwest) side of North San Pedro Road.</p>	<p>Sewer manhole and dwarf hydrant for the Weber Point (part of State Parks) facilities.</p>

6.2.2 Sub-Alternatives

No sub-alternatives were identified for this alignment.

6.2.3 Design Considerations

The following factors were considered while scoring this alternative.

6.2.3.1 Unfavorable Considerations

The North Alignment provides the District with few potential recycled water customers other than Peacock Gap Golf Club without extending the pipeline in the future. As such, it has a similar cost per acre-foot as the South Alignment despite likely requiring less capital costs to install.

Although the North Alignment is shorter than the South Alignment, the complications related to potential environmental and cultural impacts have caused State Parks to outright reject the possibility of obtaining the access and easement rights necessary to construct the pipeline through China Camp State Park. Additionally, as mentioned previously, the route around the tip of the peninsula was ruled out many years ago due to additional concerns related to known cultural deposits along that route. Without the cooperation from State Parks, this alternative cannot be constructed. However, should it be believed that the District can eventually negotiate with State Parks to obtain the necessary permissions, there are still challenges associated with potentially coordinating with the County's plan to raise or relocate North San Pedro Road. Additionally CEQA/NEPA compliance would be the most challenging for this alternative. Due to the environmental concerns presented by State Parks during the Project's stakeholder coordination meeting described above, the timeline and feasibility of the County's roadway project is also perceived to be in question, which could have the ability to hold up the District's Project as well.

Sea Level Rise is also a consideration. Sections of North San Pedro Road are near existing high tide level and currently experience flooding during extreme events. Although a detailed sea level rise scenario is outside this project's scope of work, it is assumed that portions of the road are likely to become submerged if the County is not able to modify the roadway, making future pipeline maintenance extremely difficult if not impossible.

6.2.3.2 Favorable Considerations

Should the concerns related to access, easements, and environmental/cultural impacts be able to be mitigated, this alignment is roughly half the length of the South Alignment and, subsequently, would cost roughly half of what it would take to build the South Alignment. The North Alignment is also the most favorable from a geotechnical perspective due to the likely presence of more substantial soils in areas closest to the hillside. Due to the relatively poor condition of the roadway, it is possible that pavement restoration requirements could be less onerous than those imposed on the South Alignment; however, the unknown future of the County's roadway project and the historical precedence set by the County requiring extensive roadway restoration for this roadway segment may not prove that to be true. Due to the lack of existing utilities, residences, and businesses along the alignment, this alternative would have drastically less impacts on the public and local circulation.

6.2.4 Scoring

A final detailed scoring breakdown of the North Alignment has been provided in Table 10.

Table 10. North Alignment Weighted Scoring				
Evaluation Criteria	Notes	Weight	Rating (1=worst, 5=best)	Score
District Interest & Considerations				
Ease of Maintenance(a)	May require special coordination with State Parks to maintain the pipe once installed; however, traditional equipment should be sufficient	8%	3	0.24
Coordination with Other Projects	Would require close coordination with County and State Parks related to roadway reconstruction; timing may not line up with proposed roadway project	1%	1	0.01
Beneficial Use	Not as much beneficial use expected compared to the South Alignment, but possible beneficial use by China Camp State Park may exist; may include limited expansion to certain areas within Peacock Gap HOAs	10%	2	0.20
Easements, Land Acquisition, and Agreements(a)	Easements/agreements required through China Camp State Park, and State has mentioned that it is possible that the State won't be in support of the project or grant an easement	6%	1	0.06
Subtotal		25%	7	0.51
Design Considerations				
Topographic Survey Effort(a)	Smaller survey effort; lesser traffic impacts; conventional methods	1%	5	0.05
Geotechnical Field Investigations(a)	Depends on whether or not an HDD crossing is utilized; if open-cut construction is assumed, standard borings/CPT tests would be conducted	1%	4	0.04
Utility Congestion(a)	Limited utility congestion expected along N San Pedro Rd before China Camp State Park	3%	4	0.12
Trenchless Design Complexity(a)	If HDD crossing is used, large staging area would be required and significant roadway impacts would occur although traffic volumes are not significant; bay mud and rock outcroppings may pose challenges	4%	2	0.08
Subtotal		9%	15	0.29
Constructability Considerations				
Pavement Restoration(a)	It is assumed that less pavement restoration would be required compared to South Alignment due to pending roadway reconstruction project and poor current pavement condition	4%	4	0.16
Geotechnical Considerations(a)	HDD may prove very challenging. If open-cut is assumed, soils should be more stable for this alignment.	4%	4	0.16
Trenchless Installation(a)	Complex trenchless crossing expected at Marsh Causeway	4%	2	0.08
Construction Access and Site Constraints(a)		4%	5	0.20
Subtotal		16%	15	0.60
Public Impacts				
Traffic Impacts		3%	3	0.09
Noise / Dust During Construction	Construction along N San Pedro Rd nearby residential areas	2%	3	0.06
Subtotal		5%	6	0.15
Environmental Considerations				
CEQA Documentation(a)	An Initial Study/Mitigated Negative Declaration is anticipated to be the appropriate CEQA document. If the project uses funds from the Clean Water State Revolving Fund (SRF) program, then the CEQA document would be required to meet SRF CEQA-Plus requirements.	3%	1	0.03
NEPA Documentation(a)	No NEPA documentation is anticipated	4%	5	0.20
Biological Resources Impacts	Significant impacts to biological resources, including jurisdictional wetlands and waters, sensitive natural communities, and species, are anticipated. Mitigation could be developed to reduce all impacts to less than significant levels	3%	3	0.09
Cultural Resources Impacts	Impacts to cultural resources are possible due to ground disturbance (e.g., trenching) in areas of high cultural resource occurrence. Tribal cultural resources are also likely to occur within the project vicinity and may be impacted during construction. Potentially significant cultural resources could be mitigated to a less than significant level.	3%	1	0.03
Compensatory Mitigation(a)	No compensatory mitigation is anticipated	3%	5	0.15
Water Permits (10, 404, 401, 1600, BCDC)(a)	Drainages and culverts may be affected by construction within road to install the pipeline. Required permits are anticipated to include 404, 401, 1600. Work within 100 feet of the Bay will require a minor permit from BCDC. Obtaining a ROW from State Parks, however, could be at risk given conflicts with NERR project.	3%	3	0.09
Species Permits(a)	The project could impact federally and state listed plant and wildlife species. The project could impact federally and state protected wildlife if present in work spaces during construction. No impacts to critical habitat are anticipated. Federal and state Incidental Take Permit coverage would likely be required for trenching in areas adjacent to the salt marsh.	3%	3	0.09
Number of responsible agencies	Considerable coordination with resource agencies and local jurisdictions would be required during preparation of the IS/MND. Responsible and Trustee agencies and interested parties are anticipated to include Marin County, State Parks, BCDC, State Lands Commission, USFWS, CDFW, USACE, the SFBRWQCB, the SWRCB, the SHPO, and the Graton Tribe.	3%	1	0.03
Subtotal		25%	22	0.71
Overall Project Cost				
Overall Project Cost	Lowest estimated overall project cost	20%	4	0.80
TOTALS		100%	69.00	3.06
(a) Identifies an Evaluation Criteria as a Cost Related Criteria. Cost Related Criteria are already included as part of the construction cost estimate, therefore the Cost Related Criteria in these instances are being evaluated based on other attributes such as overall risk, schedule impacts, and constructability, etc.				

6.3 Bay Alignment

The Bay Alignment is the shortest of the three alternatives (approximately 26,000 feet) extending from the LGVSD recycled water facility to the Peacock Gap Golf Club. The alignment traverses existing marsh land, crosses Gallinas Creek, and would require the installation of a 17,000-foot-long portion of pipeline within San Pablo Bay. The pipeline alignment leaves San Pablo Bay and comes onshore near the existing roadway that heads towards the China Camp State Park Visitors Center and continues along the same path as the North Alignment through China Camp State Park to Biscayne Drive. This alignment is the shortest of the alternatives, but also requires the most technically complex (and questionably feasible) trenchless installation coupled with numerous regulatory and biological hurdles.

6.3.1 Site Visit Highlights

The alignment is located partially in the San Francisco Bay National Estuarine Research Reserve within the shallow waters of Gallinas Creek and San Pablo Bay and would require installation along tidally-influenced marshland. Existing features observed along this alignment include a pipeline outfall, wooden stakes, rocks, posts, markers, piles, dangerous wrecks, duck blinds, and overhead electrical towers/poles/lines.



LGVSD has three reclamation ponds that are used primarily as recycled water storage facilities.



LGVSD has recycled water pipe (purple pipe) exiting their treatment facility. MMWD and North Marin Water District both use the facility's recycled water for irrigation.

Not much could be discerned about the portion of the alignment within the bay during the site visit due to the distance that exists between North San Pedro Road and the water's edge.



View from just west of Five Pine Point looking north along the proposed Bay Alignment



Looking east from North San Pedro Road just east of Buck's Landing. The waters edge is barely noticeable past the existing marsh lands.

Once the alignment leaves the bay and comes back onshore, it follows the same alignment as the North Alignment through China Camp State Park, the observations of which are described in Section 6.2 above.

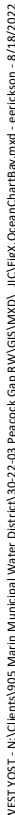
6.3.2 Sub-Alternatives

No sub-alternatives were identified for this alignment.

6.3.3 Design Considerations

While this alignment may be the shortest of the alignments requiring the least amount of asphalt restoration, and the least amount of mitigation for existing utility conflicts, there are several design considerations that need to be considered.

While viewing the alignment from North San Pedro Road, depending on the height of the current tide, one may be led to think that sufficient depth exists below the water line to place a pipeline along the bottom of the bay. However, based on a Coast Survey map prepared by the NOAA (a portion of which is shown in Figure 6 below), tidal marshlands make up most of the alignment with only a small portion of the alignment located within open water, and even then, the depths don't appear to be exceed 2 feet in the deepest segments at the "lower low water level". As such, sinking a pipeline to the bottom of the bay is not a viable option as it would be an obstacle for water craft and may even remain exposed above the water line depending on the current tide leaving it vulnerable to ultra violet exposure, wave action, and other elements that would likely contribute to the degradation of, or damage to, the pipeline.



— Bay Alignment



Marin Municipal Water District
Peacock Gap
Recycled Water (RW) Project

Due to the shallow depths of this portion of San Pablo Bay, the only theoretically suitable installation for a pipeline along this alignment would be HDD. However, as discussed in the “Geotechnical Desktop Study” and “Potential Trenchless Crossings Study,” both prepared by MMJ and provided in Appendices C and E, installing the pipeline along the proposed alignment using HDD is problematic and not advisable for the following reasons (see Appendices C and E for more complete discussion on these factors):

- There are likely several “change-on-reach” conditions where the soil type likely transitions from Young Bay Mud, Franciscan sandstone, and shale bedrock.
- The thickness of the Young Bay Mud as illustrated in the geotechnical memo included in Appendix D are anticipated to be between 20 and 40 feet. Due to the lack of inherent strength of the Young Bay Mud, it would be difficult to keep the Young Bay Mud along the alignment from collapsing the bore hole prior to pipe pullback and may not be strong enough to support heavy construction equipment for a marine installation.
- Because the Young Bay Mud may try to collapse the bore hole, starting/stopping pipe pullback would not be advisable so the entire 17,000-foot pipe string would likely need to be pre-fused and stored near one end of the installation. Observations made using aerial imagery and the completed site visit leaves us questioning where sufficient room exists to pre-string this length of pipe prior to pullback.
- Attempting to pull back 17,000 feet of pipe through Young Bay Mud would require a pipe tensile strength that exceeds the allowable tensile strength of a DR 7 HDPE pipe.
- The Young Bay Mud is not anticipated to have enough strength to contain the high fluid pressure required to establish a pilot bore for this length of installation, which would be considered a fatal flaw in the design.
- The geotechnical investigation required during the design of this installation would require a minimum of six costly and complex overwater borings that would need to extend to a depth on the order of 100 feet below the ground surface or mudline.

Additionally, as stated earlier in this PDR, the ACOE stated at the MCSTOPPP meeting that the Bay Alignment would only be allowed to move forward if other alternatives were proven to be infeasible or inflict greater impacts on environmental resources, which is not accurate.

For all these reasons, it does not appear that the Bay Alignment can gain regulatory approval or be completed successfully given the technical and geotechnical factors.

6.3.4 Scoring

A final theoretical, detailed scoring breakdown of the Bay Alignment has been provided in Table 11; however, it is difficult to confirm costs for this installation as it’s believed to be technically infeasible.

Table 11. Bay Alignment Weighted Scoring				
Evaluation Criteria	Notes	Weight	Rating (1=worst, 5=best)	Score
District Interest & Considerations				
Ease of Maintenance(a)	Alignment requires specialize equipment and permission to access	8%	1	0.08
Coordination with Other Projects	No other known projects along Bay alignment other than possible marsh restoration project near WWTP	1%	4	0.04
Beneficial Use	No additional beneficial use expected	10%	1	0.10
Easements, Land Acquisition, and Agreements(a)	Agreements with State and environmental agencies required	6%	1	0.06
Subtotal		25%	7	0.28
Design Considerations				
Topographic Survey Effort(a)	Bathymetric survey required	1%	1	0.01
Geotechnical Field Investigations(a)	Most expensive, specialty equipment and permitting required, requires marine survey	1%	1	0.01
Utility Congestion(a)	Little to no utility congestion expected	3%	5	0.15
Trenchless Design Complexity(a)	HDD is not considered feasible and is not reccomended	4%	1	0.04
Subtotal		9%	8	0.21
Constructability Considerations				
Pavement Restoration(a)	Minimal pavement restoration required (isolated to entry/exit pits if located in pavement)	4%	5	0.20
Geotechnical Considerations(a)	HDD is not considered feasible and is not reccomended	4%	1	0.04
Trenchless Installation(a)	HDD is not considered feasible and is not reccomended	4%	1	0.04
Construction Access and Site Constraints(a)	HDD is not considered feasible and is not reccomended	4%	1	0.04
Subtotal		16%	8	0.32
Public Impacts				
Traffic Impacts	Little to no traffic impacts	3%	5	0.15
Noise / Dust During Construction	Little to no construction in areas that would warrant dust/noise complaints	2%	5	0.10
Subtotal		5%	10	0.25
Environmental Considerations				
CEQA Documentation(a)	An Initial Study/Mitigated Negative Declaration is anticipated to be the appropriate CEQA document. If the project uses funds from the Clean Water State Revolving Fund (SRF) program, then the CEQA document would be required to meet SRF CEQA-Plus requirements	3%	2	0.06
NEPA Documentation(a)	A NEPA EA may be required. If required, USACE would be the NEPA lead agency. USACE would prepare the EA	4%	3	0.12
Biological Resources Impacts	Significant impacts to biological resources, including jurisdictional wetlands and waters, sensitive natural communities, and species including fish species, are anticipated. Mitigation could be developed to reduce all impacts to less than significant levels. The project could conflict with restoration efforts at McInnis Marsh.	3%	2	0.06
Cultural Resources Impacts	Impacts to cultural resources are anticipated to be low to moderate since most of hte pipeline would be sunk to the Bay floor. Trenching activities may affect archaeological and tribal resources in areas where the pipeline would be installed underground. Potentially significant cultural resources could be mitigated to a less than significant level.	3%	4	0.12
Compensatory Mitigation(a)	All impacts along the alignment are anticipated to be temporary; however, the SFRWQCB occasionally requires compensatory mitigation for temporary impacts. Compensatory mitigation is anticipated to be required for temporary impacts to the salt marsh due to impacts on sensitive marsh habitat, but shouldn't be substantial	3%	3	0.09
Water Permits (10, 404, 401, 1600, BCDC)(a)	Complicated permitting processes are anticipated for the 401 and 1600 permits. Bay Alternative would require a Major Permit from BCDC. The project requires a Section 10 permit from Army Corps and may qualify for coverage under Nationwide Permit 58 from USACE. If an Individual Permit is required, USACE requires an alternatives analysis as part of an Individual Permit application. The alternatives analysis must indicate that the Bay Alternative is the least environmentally damaging practicable alternative, otherwise, USACE will not issue the permit.	3%	2	0.06
Species Permits(a)	The project could impact federally and state listed plant and wildlife species. The project would impact marsh, shoreline, and aquatic habitats that support a variety of federally and state protected species. Impacts to habitat would likely be temporary. Federal and state Incidental Take Permit coverage would likely be required for trenching within the salt marsh and for impacts to fish in the Bay, which would not occur with the other two alternatives.	3%	2	0.06
Number of responsible agencies	Responsible agencies would likely include: Marin County, City of San Rafael, BCDC, State Lands Commission, State Parks, CDFW, SFRWQCB. State Water Resources Control Board would be a responsible agency if the project is funded through the SRF. Consultation with responsible agencies is anticipated to be somewhat complex due to impacts in the Bay and McInnis Marsh.	3%	2	0.06
Subtotal		25%	20	0.63
Overall Project Cost				
Overall Project Cost	Anticipated costs are likely to be more expensive than the North alignment but cheaper than the South alignment. Costs for this alignment also have the highest degree of uncertainty.	20%	3	0.60
TOTALS		100%	56.00	2.29
(a) Identifies an Evaluation Criteria as a Cost Related Criteria. Cost Related Criteria are already included as part of the construction cost estimate, therefore the Cost Related Criteria in these instances are being evaluated based on other attributes such as overall risk, schedule impacts, and constructability, etc.				

6.4 Cost Comparison

A detailed cost estimate for each alignment has been provided in Appendix G. Each cost estimate includes items of work that are anticipated to be required to install each alternative. Unit prices have been estimated from bid spreads generated from other projects completed by West Yost.

A design contingency of 20 percent has been included in each estimate to account for elements of final design that may not be currently known or feasible to estimate at this early stage. The intent is that this design contingency will be reduced as the design evolves and becomes more mature.

A standard 10 percent construction contingency for budgetary purposes has also been included to account for changes that may occur during construction. This contingency will remain in the estimate for the duration of the final design phase.

An estimate of soft costs for each alternative has also been included in each estimate. These are intended to be estimates only and should not be considered as final fee estimates to be relied upon for future contractual obligations for design services required to deliver the Project. It is understood that once the District selects a final Project alternative, the design team will have the opportunity to prepare an official scope of services and fee estimate for the selected Project.

Scoring for each alignment, as described and summarized in Section 6.6 below, includes cost as one of the design criteria contributing to the overall score. That said, a summary of the Project costs are provided in Table 12 below.

Table 12. Summary of Project Costs by Alignment					
Alignment	Construction Subtotal, \$	Design Contingency (20%), \$	Construction Contingency (10%), \$	Soft Costs, \$	Total Project Cost, \$
South	19.0M	3.8M	1.9M	2.0M	26.7M
North ^(a)	11.5M	2.3M	1.2M	1.7M	16.6M
Bay ^(b)	14.1M	2.8M	1.4M	1.6M	19.9M
(a) North Route is not considered feasible due to rejection of easement from California State Parks (Appendix C), but has been estimated to provide an idea of potential cost.					
(b) The Bay Alignment is not considered feasible, but has been estimated to provide an idea of potential cost.					

6.5 Recycled Water Demand Comparison

Although the total anticipated design and construction costs are summarized in Table 12 above, a summary of costs would be incomplete without reviewing the cost per acre-foot of recycled water anticipated to be delivered to customers along the alignment. District staff has provided an estimation for the anticipated customer demand for recycled water along each alignment. Those estimates are summarized in Tables 13 and 14 below and were used to develop Table 15 which summarizes the calculated cost per acre-foot of water to be delivered by each alignment.

Table 13. Anticipated Recycled Water Average Daily Demand

Alignment	Potential Service Connections	Peacock Gap Golf Course Demand, gal	Additional Service Connection Demand, gal	Total Average Daily Demand, gal
South	67	154,361	99,675	254,036
North	10	154,361	2,580	156,896
Bay	6	154,361	0	154,361

Table 14. Anticipated Recycled Water Average Annual Demand

Alignment	Peacock Gap Golf Course Demand, ac-ft	Additional Service Connection Demand, ac-ft	Total Average Annual Demand, ac-ft
South	173	112	285
North	173	3	176
Bay	173	0	173

Table 15. Anticipated Cost Per Unit of Recycled Water Delivery

Alignment	Total Average Annual Demand, ac-ft	Total Project Cost, \$	Total Cost, \$/ac-ft
South	285	26.7M	94k
North	176	16.6M	94k
Bay	173	19.9M	115k

6.6 Alternatives Analysis Results

Tables 9, 10, and 11 presented above provide a detailed breakdown of the scoring and weighting of each design criteria for each alignment. Table 16 below summarizes the results of the weighted scoring using the design criteria and weights presented in Section 5.0 above.

Table 16. Summary of Weighted Scoring of Design Criteria By Alignment

Alignment	Total Score (Max Possible = 115)	Weighted Score (1=worst, 5=best)
South	78	3.21
North	69	3.06
Bay ^(a)	56	2.29

(a) The Bay Alignment is not considered feasible, but has been scored anyway to provide a complete comparison to the other alternatives.

The preferred alignment for the Project is the South Alignment based on the design criteria, scoring weights, and final costs.

7.0 DISTRICT'S PREFERRED PROJECT

In conclusion, after reviewing all data provided by the District, combing through all existing utility information, meeting with all stakeholders, assessing existing site conditions, analyzing anticipated costs, and comparing potential customer demands, the District's preferred Project is described as follows:

- The design and installation of a 12-inch diameter fusible PVC pipeline along the South Alignment utilizing the existing Linden Lane undercrossing to cross US 101 and the SMART tracks. At this time, hydrants are not anticipated to be installed with the Project, and valves will be placed along the pipeline at strategic locations using input from the District's operations staff (valves, stubs, and services are not currently shown on the drawings).
- The assessment and conversion of the Peacock Gap Tank to a recycled water tank.
- The Project is anticipated to be constructed within existing paved roadways under the jurisdiction of the City of San Rafael and Marin County primarily using traditional open-cut construction methods, except where short trenchless crossings may be necessary to cross large existing culverts/pipelines.
- Preparation of a topographic survey along the entire length of the alignment. This survey is anticipated to be performed using aerial methods with inverts of gravity utility structures and surface locations of other utility features (i.e. valves, appurtenances, vaults, boxes, etc.) being obtained using more conventional ground survey crews.
- A detailed geotechnical investigation will be performed involving approximately 9 to 12 seismic refraction geophysical surveys and approximately 24 borings and/or cone penetration tests.
- Refinement of the existing utility base map along the entire alignment using a combination of non-invasive methods (i.e. electromagnetic locating, ground penetrating radar, etc.) and potholing in accordance with ASCE Standard 38-02.
- CEQA compliance will consist of an IS/MND that is anticipated to require approximately 12 to 14 months to complete.
- The Project is anticipated to take over year to design and another year or two to construct depending on weather, permitting, and site constraints. The Project is anticipated to cost approximately \$26.4M and serve approximately 67 connections within the District's service area with recycled water, offsetting average daily demand of potable water by 254,000 gallons (285 ac-ft annually).
- Assuming the team receives a Notice To Proceed for final design by December 2022, it is estimated that the Project could be ready for bidding in early 2024 with construction timing being dependent on availability of funding.

Per the District's request, a preliminary set of design plans has been prepared for the concept and included as Appendix H.

8.0 FUNDING OPPORTUNITIES

West Yost’s Funding Team has prepared a summary of potential sources of alternative funding based on current known and potential future grant and loan programs. The opportunities are applicable for at least partially funding the construction and/or design of a recycled water pipeline from an existing recycled water treatment plant.

It’s worth noting that California Governor Gavin Newsom recently unveiled a broad strategy for bolstering California’s water supply that includes targets to recycle more water, expand reservoir storage and collect more data on the amounts farmers use. The Plan calls for California to develop about 6.9 million acre-feet of new water supplies — through storage, recycling, conservation and other means — by 2040.

The budgets of the funding programs summarized in Tables 17 and 18 below are subject to the approval and appropriation of funds by either the California Legislature, California voter approved bonds, and/or Congressional appropriations.

Multiple funding sources can be used to maximize grant funds and/or combined with low interest loans. The general rule of using multiple funding sources is state and federal funds may be used on the same project; however, the same project cannot be funded from only multiple federal programs or only multiple state programs.

Additional sources of funding may also be available if the project provides environmental benefits and/or improves watershed health.

This information is subject to change during future funding years, including the availability of funding. Additional funding opportunities may also become available as future state bonds and/or federal and state legislature appropriations.

Table 17. State Alternative Funding Program Summary

State Funding Program	Funding Type	Project Type	Applicant	Project Funding	Recommendations
Marin County ARPA Funds	Grant	<ul style="list-style-type: none"> Climate Change focus Design and/or construction 	Public Agency	<ul style="list-style-type: none"> Up to 100% grant funds as determined by the County <p>Funds must be encumbered by 2024 and spent by 12/31/26</p>	Apply now
City of San Rafael ARPA	Grant	Water and wastewater projects are eligible for funds	Public Agency	<ul style="list-style-type: none"> City received over \$16M. It is unclear if any funds remain to be allocated <p>Funds must be encumbered by 2024 and spent by 12/31/26</p>	Inquire if any funds are being offered for special districts.
Water Recycling Construction Grant/Loan	Grant and/or Loan	Design & Construction	Public Agency	<ul style="list-style-type: none"> Design and construction of water recycling infrastructure Grant - 35% of project costs up to \$5M Loans 1% to 1.5%, 50% of project costs Non-competitive annual funding <p>Disadvantaged and severely disadvantaged are prioritized</p>	<ul style="list-style-type: none"> Contact SWRCB regarding funding availability and timing to submit an application Assuming SWRCB has funds available, recommend applying after PDR is completed.
Clean Water State Revolving Loan Program	Loan	Design & Construction	Public Agency	<ul style="list-style-type: none"> Design and construction of water recycling infrastructure Non-competitive annual funding Long process requiring environmental review, revenue review for loan repayment (>18 months). 	Joint application process with the Water Recycling Construction Grant. Recommend applying.

Table 17. State Alternative Funding Program Summary

State Funding Program	Funding Type	Project Type	Applicant	Project Funding	Recommendations
Urban and Multi-benefit Drought Relief Grant Program	Grant	Planning, Design, Construction of recycled water for immediate drought relief	Public Agency	<ul style="list-style-type: none"> • 100% grant • Awards \$2M + • Project must address an immediate drought impact and provide 2 or more benefits. • Disadvantaged, low-income communities and/or under-represented communities (rural/Native American Tribes) are current priority. • Future cycle expected after July 2022, which may have different priorities. • Highly competitive 	Apply when funds become available in fall.
Integrated Regional Water Management (IRWM) Grant	Grant	Recycled Water Pipeline, pump station, & RW Storage	Public Agency	<ul style="list-style-type: none"> • 75% Grant • IRWM Region call for projects is open 8/12/22 – 10/10/22. • Highly competitive • \$22M available for the region 	Apply now

Peacock Gap Recycled Water Transmission Pipeline



Table 18. Federal Alternative Funding Program Summary

State Funding Program	Funding Type	Project Type	Applicant	Project Funding	Recommendations
Building Resilient Infrastructure and Communities (BRIC)	Grant	<ul style="list-style-type: none"> Recycled Water expansion for drought mitigation 	Subapplicant to State	<ul style="list-style-type: none"> 75% Grant Up to \$50M Design and Construction 2-step application process Highly competitive 	Submit a Notice of Interest before 9/16/22.
WaterSMART: Drought Response Program – Drought Resiliency Project	Grant	<ul style="list-style-type: none"> Recycled Water Pipeline, pump station, and RW storage 	Public Agency	<ul style="list-style-type: none"> 50% Grant Up to \$5M Construction Phase Highly Competitive 	Apply when funding solicitation opens Spring 2023 (est.)
Title XVI WIIN Act Water Reclamation and Reuse Projects	Grant	Recycled Water Pipeline, pump station, & RW Storage Planning, design, and construction	Public Agency	<ul style="list-style-type: none"> 25% Grant Feasibility study must be completed first Grants are typically \$1M - \$6M per project. Competitive 	Apply when opens January -March 2023 (est.)
WaterSMART: Water and Energy Efficiency Grant	Grant	Recycled Water Pipeline, Pump Station if used to offset potable water use. If solar is incorporated, it may be a more competitive project	Public Agency	<ul style="list-style-type: none"> 50% Grant Construction only, may include final design (minimal) Must have quantified water savings or energy savings Up to \$5M Highly Competitive 	<ul style="list-style-type: none"> Alternative to Title XVI and Drought Response Programs. Cannot apply to all, but is an alternative if no funding from other federal grants
Multi-Benefit Project to Improve Watershed Health	Grant	TBD. Guidelines in development.	Public Agency	<ul style="list-style-type: none"> New US Bureau of Reclamation grant coming late 2022/early 2023 	To be determined



Appendix A

Utility Coordination Information

Appendix B

SMART Crossing Standards

Appendix C

Letter from State Parks



Appendix D

Geotechnical Memo



Appendix E

Environmental Memo



Appendix F

Trenchless Design Memo

Appendix G

Cost Estimates



Appendix H

Preliminary Design Drawings