OCCIDENTAL TO GRATON WASTEWATER PIPELINE FEASIBILITY STUDY

OCCIDENTAL COUNTY SANITATION DISTRICT

JUNE 15, 2022

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1. EXECUTIVE SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Occidental County Sanitation District (OCSD), operated by Sonoma Water, currently trucks OCSD wastewater to the Airport/Larkfield/Wikiup Sanitation Zone wastewater treatment plant (Airport WWTP) for treatment and reuse. Trucking OCSD wastewater to the Airport WWTP is expensive, is a source of air emissions, and is not considered a sustainable long-term wastewater management solution.

Both OCSD and Graton Community Service District (GCSD) have faced financial challenges associated with operating a small wastewater system. A partnership between OCSD and GCSD would reduce trucking costs for OCSD, reduce the emissions from trucking wastewater, and provide an economy of scale for treatment and collection of wastewater which would economically benefit both districts. In the long-term, this would enhance rate stability for both districts by reducing operational costs for OCSD and broadening GCSD's user base.

The purpose of this study was to evaluate the feasibility of transferring wastewater from OCSD to GCSD, either through a proposed pipeline or by trucking, and compare these alternatives to the existing trucking operations to the Airport WWTP. The study consisted of three main parts:

1. Pipeline Alternative Analysis
2. Trucking Alternative Analysis
3. Pipeline and Trucking Alternatives Comparison

For both the pipeline and trucking alternatives, required capital improvements, appropriate facility operations and maintenance, institutional impacts and the associated costs were considered as the basis for determining the feasibility of each alternative. The findings and recommendations are presented in the following sections.

1.1 PIPELINE ALTERNATIVES ANALYSIS

Below are the main findings and recommendations from the Pipeline Alternatives Analysis.

The Pipeline Alternative Analysis consisted of the following considerations:

- Pumping station location in Occidental
- Pipeline alignment from Occidental to Graton
- Termination location of pipeline in Graton

The new pumping station was proposed to be located at the existing OCSD lift station. With some modifications, the existing Imhoff Tank at the lift station site could be utilized as the wet well for the new pumping station. The pumping equipment would consist of either a duplex or quadraplex grinder pump facility.

The routing of the pipeline would be from the pumping station parallel to Bohemian Highway to Graton Road, then east along Graton Road to Ross Road. The topography of this alignment is such that a combination pressure/gravity pipeline would not be feasible. Therefore, the pipeline would be a 4-inch HDPE force main sized to convey the design pumping flow rate of 178 gpm.

The pipeline would be terminated either within the Graton collection system or at the GCSD WWTP.

Because of the current capacity of the GCSD WWTP, it was determined that the existing storage at the OCSD treatment plant site would need to be utilized for equalization of wastewater flows during peak flow events. Normal operations would limit discharges into the GCSD collection system such that a daily average flow of 288,000 gpd (200 gpm) would not be exceeded at the GCSD WWTP due to transfers of OCSD wastewater. It was determined that limited trucking to the Airport WWTP would be necessary in wet and average weather years but may not be necessary in dry weather years.

It was assumed for cost estimating purposes that GCSD would assume responsibility of the operation and maintenance of the OCSD system. Additionally, a connection fee would be paid to GCSD for connection to the treatment plant and for connection to the collection system for pipeline alignment alternatives that terminated within the GCSD collection system. Potentially, in lieu of, or to offset a portion of the connection fees, OCSD could finance the construction of a capital improvement plan (CIP) project. This would need to be negotiated between the two entities.

1.2 TRUCKING ALTERNATIVE ANALYSIS

Below are the main findings and recommendations from the Trucking Alternative Analysis.

The Trucking Alternative Analysis consisted of the following infrastructure and operational considerations:

- Truck receiving station in Graton
- Truck operations

The truck receiving station location considered for this study was the southwest corner of the intersection of Green Valley Road and Hicks Road. This is the location identified in the Recirculated Initial Study/Proposed Mitigated Negative Declaration for the Occidental Wastewater Transport and Treatment Project in March 2021. The capital costs associated with this alternative consist only of the construction costs associated with the truck receiving station.

Due to the information included in the Initial Study and the recommendations of GCSD staff, trucking would only occur 7AM to 5 PM, Monday through Friday and would be limited to 30 trips to GCSD per week. Additionally, normal operations would limit discharges into the GCSD collection system such that a daily average flow of 288,000 gpd would not be exceeded at the GCSD WWTP due to transfers of OCSD wastewater.

Because of these limitations on trucking operations and the capacity of the GCSD WWTP, storage at the OCSD treatment plant site would need to be utilized to equalize flow over weekends and during peak flow events. It was determined that trucking to the Airport WWTP would be necessary in wet and average weather years (for trips in excess of 30 per week) but may not be necessary in dry weather years.

It was assumed for cost estimating purposes that GCSD would assume responsibility for the operation and maintenance of the OCSD system. Additionally, a connection fee would be paid to GCSD for connection to the treatment plant and for connection to the collection system. Potentially, in lieu of, or to supplement paying a connection fee, OCSD could finance the construction of a CIP project. This would need to be negotiated between the two entities.

Existing trucking operations to the Airport WWTP, allow for trucking Monday through Friday from 7 AM to 5 PM (and at other times during emergencies and with prior notification of surrounding residents) with no weekly truck limit. Additionally, the Airport WWTP can accept all OCSD flows, year-round. However, OCSD has higher staff costs than GCSD. The existing trucking operations

have higher operation and maintenance costs due to the longer trucking distance and higher labor costs.

1.3 PIPELINE AND TRUCKING ALTERNATIVE COMPARISON

The existing trucking to the Airport alternative has the highest operation and maintenance cost and the highest present worth of any of the alternatives despite the pipeline alternative having the highest capital cost. The pipeline alternative has the lowest annual operation and maintenance cost, but the trucking to Graton alternative has the lowest present worth because of the low capital costs.

Public funding may be available to pay for the capital costs associated with the pipeline alternative. If this were to occur and no debt services would need to be amortized, the pipeline alternative would then have the lowest present worth. Additionally, if the connection fee were either partially or fully funded as well, the service fee for OCSD customers could be reduced below what is currently charged.

1.4 OVERALL STUDY RECOMMENDATIONS

The overall study conclusions and recommendations are as follows:

1. If pipeline capital costs are funded from grants or other funding sources outside of ratepayer funding, the Pipeline Alternative should be selected as the preferred alternative. Pipeline Alternative 1A is the preferred alternative as it has the lowest present worth of the pipeline alternatives. However, during design and negotiations with GCSD, the exact pipeline routing and connection location should be refined further.
2. If a minimum of 50 percent of the pipeline capital costs cannot be funded using grants or other sources of funding outside of ratepayer funding, then the Trucking to Graton Alternative should be selected, because it has the lowest present worth of the alternatives considered.

2. BACKGROUND AND EXISTING FACILITIES

The Occidental County Sanitation District (OCSD), operated by Sonoma Water, currently conveys via trucking the collected wastewater from the OCSD lift station site to the Airport/Larkfield/Wikiup Sanitation Zone wastewater treatment plant (Airport WWTP) for treatment and reuse. Trucking OCSD wastewater to the Airport WWTP is expensive, is a source of air emissions, and is not considered a sustainable long-term wastewater management solution.

The Graton Community Services District (GCSD) operates a wastewater treatment facility and has expressed a willingness to consider receiving and treating wastewater from OCSD.

Both OCSD and GCSD have faced financial challenges associated with operating a small wastewater system. A partnership between OCSD and GCSD should reduce trucking costs for OCSD, reduce the emissions from trucking wastewater, and provide an economy of scale for treatment and collection of wastewater that would economically benefit both districts.

Sonoma Water has solicited the development of this Occidental to Graton Wastewater Pipeline Feasibility Study to evaluate the feasibility of transferring wastewater from OCSD to GCSD, either through a proposed pipeline or by trucking, and analyze the construction and operational impacts of both alternatives. The tasks performed to assess the project feasibility and alternatives analysis included the following:

1. Background Information Review
2. Pipeline Construction and Operations Analysis
3. Trucking Analysis
4. Trucking versus Pipeline Analysis

2.1 OCCIDENTAL EXISTING FACILITIES AND CONDITIONS

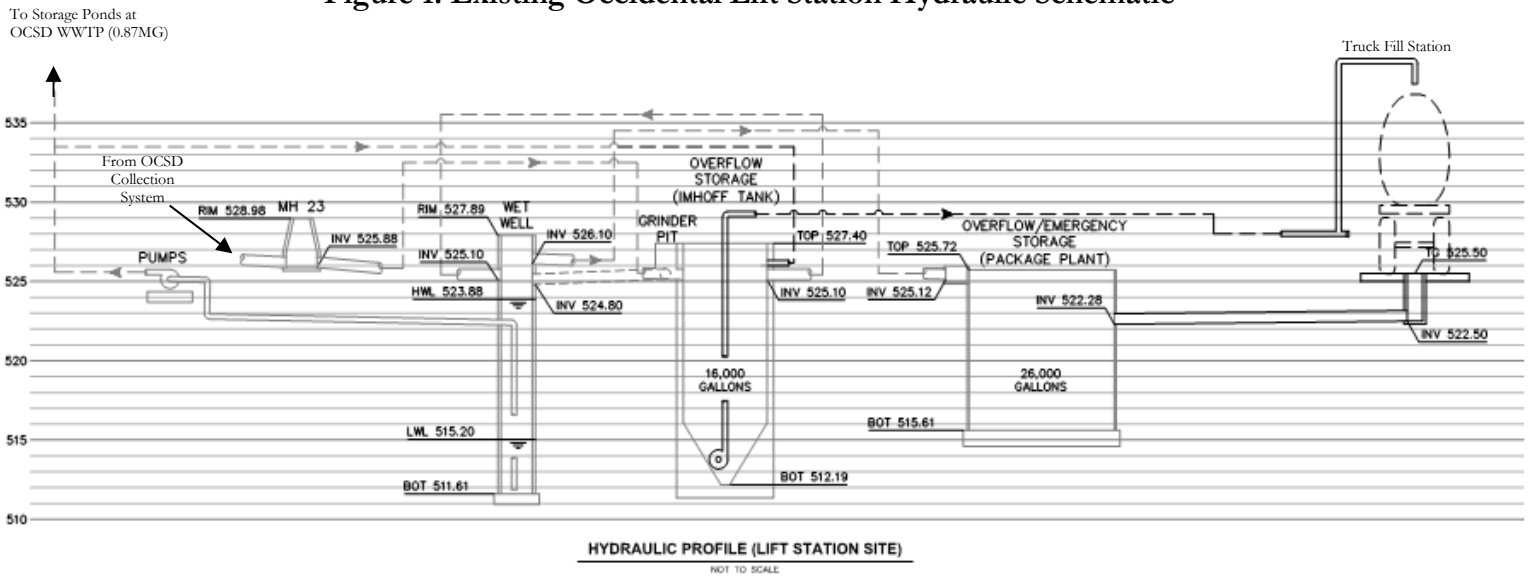
OCSD provides wastewater services to the unincorporated town of Occidental. The service area consists of approximately 273 equivalent single-family dwelling (ESD) connections[1]. OCSD staff operate and maintain a wastewater collection system and wastewater trucking operation for treatment and disposal.

2.1.1 Occidental Collection System and Existing Facilities

The OCSD collection system was originally constructed in the 1950s. The total length of the collection system is 12,670 feet and is comprised of 8,428 feet of gravity pipe, 3,200 feet of force main and 1,042 feet of private laterals. The gravity sewer conveys wastewater to a lift station site located at 4200 Occidental Camp Meeker Road in Occidental. From the lift station site, the wastewater was historically conveyed to the OCSD wastewater treatment plant (currently non-operational) located east of the village at a higher elevation. At the OCSD treatment plant site, there are two wastewater ponds (formerly used for treatment; now used for equalization during wet period) with a total estimated capacity of 0.87 million gallons (MG).

A truck filling station was constructed in 2018 at the existing lift station site. A hydraulic schematic of the lift station site is presented in Figure 1. Currently, the Imhoff Tank, which was previously converted to overflow storage, operates as a wet well for the truck filling station. The pumps that convey wastewater to the treatment plant site draw from the wet well upstream of the Imhoff Tank. By operation of valving at the lift station site (intended for wet weather flow equalization), the pipeline from the treatment plant can discharge wastewater by gravity into the Imhoff Tank.

Figure 1: Existing Occidental Lift Station Hydraulic Schematic[2]



2.1.2 Existing Occidental to Airport Trucking Operations

OCSD began trucking wastewater to the Airport WWTP in January 2019 and this operation continues today. OCSD rents two trucks from Sonoma Water that are utilized on a regular basis. Wastewater is hauled from the existing trucking station at the lift station site to the receiving station at the Airport WWTP. OCSD pays Sonoma Water $40 per hour per truck for the use of the trucks, which includes fuel and truck maintenance costs.

Typically trucking occurs between 2 and 5 days per week to economize multiple full truck loads on a single day, instead of few or partial truck loads every day. A truck load typically is 3,800 gallons. Existing trucking operations to the Airport WWTP, allow for trucking Monday through Friday from 7 AM to 5 PM (and at other times during emergencies and with prior notification of surrounding residents) with no weekly truck limit.

Trucking and wastewater volume data, from January 2019 to January 2021, was available and the monthly summary data is listed in Table 1.

Table 1 - OCSD Trucking Data – January 2019 - January 2021[3]

Month	Average Monthly Total		Daily Average	Daily Maximum
	Truck Loads	Volume	MGD	MGD
January	182.7	667,554	0.022	0.080
February	247.5	915,416	0.033	0.129
March	251	933,483	0.030	0.097
April	172	638,408	0.021	0.074
May	134.5	483,254	0.016	0.056
June	99.5	377,350	0.013	0.060
July	135	509,599	0.016	0.054
August	76.5	335,400	0.011	0.046
September	65.5	288,900	0.010	0.054
October	83.5	324,000	0.010	0.058
November	81	307,300	0.010	0.058
December	177.5	680,500	0.022	0.077

From January 2019 to January 2021, the maximum daily flow was estimated to be 128,737 gallons per day based on 35 truckloads of approximately 3,800 gallons each.

OCSD provided the revenue and operating expenses for fiscal years 2018/19, 2019/20 and 2020/21. Expenses in 2018/19 were unusually high due to the construction of the trucking infrastructure. The total average annual expenses for the other two fiscal years is approximately $1,290,000.

2.2 GRATON EXISTING FACILITIES AND CONDITIONS

GCSD provides wastewater services to the unincorporated town of Graton and supplies reclaimed water for agricultural irrigation. The service area consists of approximately 600 equivalent ESD connections. The GCSD staff operate and maintain a wastewater collection system, wastewater treatment plant and recycled water distribution and disposal system. The pertinent facilities to this study include the wastewater collection system and the wastewater treatment plant, detailed in the following sections.

Additionally, environmental documents for the construction of a truck receiving station for the purpose of receiving wastewater by tanker truck from OCSD have been prepared by GCSD. Details regarding this proposed project are summarized in Section 2.2.3.

2.2.1 Graton Collection System

The GCSD wastewater collection system consists of more than 6.5 miles of 6-, 8-, and 12-inch diameter asbestos cement pipeline and two lift stations. The system is approximately 40-years old. To evaluate the condition of the GCSD collection system and determine the rehabilitation needs, the *Demonstration Project for the Graton Community Services District* was published in December 2014 as prepared by GHD (Demonstration Project).

2.2.1.1 Graton Collection System Capacity

The GCSD collection system capacity is determined by pipe size, pipe condition, and the sizing of the lift stations.

Lift Station No. 1 receives the majority of the wastewater by gravity from central Graton and lifts it to MH 3-2 (located on Ross Road and shown on Exhibit 5), from which the wastewater flows by gravity to the Graton Wastewater Treatment Facility (Graton WWTP). Lift Station No. 1 is sized to pump 850,000 gallons per day, which is the peak wet weather design flow of the treatment plant. Lift Station No. 2 only serves two residences on Ross Road and therefore does not impact the overall collection system capacity.

The collection system pipe size and condition have been previously analyzed for capital improvement planning purposes. Several collection system capacity deficiencies and capital improvement projects were identified in the Demonstration Project. The purpose of the identified projects was to reduce inflow and infiltration and increase collection system capacity. The highest priority capital improvement project identified was the trunk sewer from MH 3-2 to the Graton WWTP. This section of sewer was found to have significant structural defects and moderate capacity issues and a capital improvement project was proposed to replace the 3,050 linear foot section of 12-inch sewer with a 15-inch sewer. The hydraulic analysis performed found that during peak flow events, sections of this sewer were flowing at approximately 85 percent capacity. This indicates that the collection system has limited capacity during peak flow events to convey additional flow.

2.2.2 Graton Treatment Plant

The Graton WWTP includes the headworks, two aerated ponds, a settling pond, tertiary filtration, a pasteurization disinfection system, and two effluent storage ponds. The Graton WWTP is permitted under National Pollutant Discharge Elimination System (NPDES) Order No. R1-2018-0001 issued by the North Coast Regional Water Quality Control Board.

2.2.2.1 Graton Wastewater Treatment Plant Capacity

The permitted design capacity of the Graton WWTP as listed in the NPDES permit is summarized in Table 2.

Table 2 - Graton WWTP Design Flow Rates[4]

Facility Design Flow	Flow Rate
Average Dry Weather Flow	0.14 MGD
Average Daily Wet Weather Flow	0.397 MGD
Peak Wet Weather Flow	0.85 MGD

2.2.2.2 Graton Wastewater Treatment Plant Flow

Influent flow is continuously monitored and reported as a daily average. A summary of the influent flow data for GCSD is summarized in Table 3.

Table 3 – Graton WWTP Influent Flow Data – August 2018 to December 2020[5]

Month	GCSD Influent Flow	
	Average Daily (MGD)	Max Daily (MGD)
January	0.157	0.449
February	0.195	0.723
March	0.209	0.836
April	0.134	0.914
May	0.110	0.301
June	0.089	0.122
July	0.087	0.117
August	0.085	0.124
September	0.086	0.116
October	0.082	0.117
November	0.094	0.184
December	0.116	0.325

The Graton WWTP was designed for an average dry weather flow (ADWF) of 0.140 million gallons per day (MGD) and an average daily wet weather flow of 0.397 MGD. Assuming dry weather flow conditions occur from May to October and wet weather flow conditions occur from November to April, the average daily flow does not exceed the design capacity. However, the peak wet weather design flow for the Graton WWTP is 0.85 MGD which maximum daily flow statistics show has been exceeded in April and nearly reached in March.

Additionally, GCSD operations staff have stated that the Graton WWTP cannot consistently treat 400 gallons per minute (0.576 MGD) over a 24-hour period due to required backwash and maintenance cycles, particularly of the pasteurization disinfection system. GCSD staff indicated that 200 gallons per minute (gpm) is a reasonable flow to consistently treat.

2.2.3 Proposed Graton Wastewater Truck Receiving Station

GCSD prepared a Recirculated Initial Study/Proposed Mitigated Negative Declaration (Initial Study) for the Occidental Wastewater Transport and Treatment Project in March 2021. This study considers one receiving station location within Graton, at the southwest corner of the intersection of Green Valley Road and Hicks Road. A previous Initial Study/Proposed Mitigated Negative Declaration was prepared in 2019 for a truck receiving station located at 4115 North Gravenstein Highway. However, during the environmental document public review period, this site was determined to no longer be viable and the revisions to the site location, transport route, and improvements were reflected in the 2021 Initial Study.

The current proposed wastewater receiving station site is located within the GCSD service boundary, adjacent to a portion of Green Valley Road west of Highway 116. The receiving station would include the construction of the receiving station, a concrete driveway pullout, new traffic striping, and sewer lateral connection on previously disturbed lands within and adjacent to Green

Valley Road. Additionally, the proposed project includes construction of a retaining wall, above and below ground piping and appurtenances, including valves, pipeline, and electrical control panels and signage. The concrete driveway pullout would be approximately 20-feet wide and 70-feet long. If required, an existing below ground storm drain would be reconstructed beneath the concrete driveway pad. See the proposed preliminary layout of the truck receiving station prepared for the Initial Study in Appendix A[6].

In conjunction with the construction of the receiving station, a 10-year agreement between OCSD and GCSD for transferring, treating, and disposing of wastewater flows from OCSD was initially discussed.

The Initial Study outlines the intended operation and maintenance of the wastewater trucking including the proposed truck route and hours of operations. The transport trucks would be filled with wastewater at the OCSD lift station site. The trucks would then travel east on Graton Road to Ross Road, north on Ross Road to Green Valley Road, and finally east on Green Valley Road to the receiving station. Returning trucks would continue traveling east on Green Valley Road to Highway 116, then south onto Mueller Road and east on Graton Road back to the OCSD lift station site.

Transportation of wastewater from OCSD to the proposed receiving station would occur on weekdays only (Monday through Friday) between 7 AM and 5 PM and would be limited to 30 trips per week.

2.3 OCCIDENTAL TO GRATON FEASIBILITY STUDY CONSIDERATIONS

This study examines the feasibility of conveying wastewater from OCSD to GCSD for treatment and disposal by both alternatives – pipeline and trucking operations. The project elements analyzed in this study consider operational strategies including equalizing wastewater flows at the OCSD facility and potentially continued trucking of wastewater to the Airport WWTP, especially during peak flow events. Additionally, the study presents an analysis of the cost, including capital costs, connection fees and ongoing service fees.

2.3.1 Operational Considerations

For both the pipeline and trucking alternatives, the limited capacity of the trunk sewer from MH 3-2 to the GCSD WWTP, as described in Section 2.2.1, would be the limiting factor in what wastewater volume GCSD could potentially receive from OCSD and the timing of these transfers of wastewater. However, GCSD staff indicated that 288,000 gpd (200 gpm) is a reasonable maximum flow to consistently treat which is less than the capacity of the trunk sewer downstream of MH 3-2. Therefore, a maximum daily flow delivered to the Graton WWTP of 288,000 gpd, was considered the main operational restriction of the transfer of wastewater from OCSD to GCSD for the alternatives analyzed in this study.

Operations at the OCSD facilities would be adjusted to restrict or eliminate discharge of wastewater to the GCSD systems such that the 288,000 gpd limit of the GCSD systems would not be exceeded due to transfers of wastewater from OCSD.

Table 4 contains a summary of the average dry and wet weather flows for OCSD, GCSD, combined flows, and the GCSD WWTP design flows.

Table 4 – Average Flow Analysis

	OCSD	GCSD	Combined OCSD & GCSD	GCSD WWTP Design Flow
Average Dry Weather Flow (gpd)	14,000	91,000	105,000	140,000
Average Daily Wet Weather Flow (gpd)	29,000	192,000	221,000	397,000

Both the combined average dry weather flow and the average daily wet weather flow for OCSD and GCSD are below the design flows and below the 288,000 gpd treatment limit. This analysis indicates that during dry weather periods the combined flow is below the treatment limit. Also, the GCSD WWTP NPDES permit states that the average daily wet weather design flow is based on the tertiary treatment filter capacity; therefore, it is assumed that the effluent storage and disposal system is capable of handling at least the average daily wet weather design flow. For these reasons, the 288,000 gpd treatment limit is assumed to be a reasonable operational limit for this analysis.

However, this treatment flowrate limit is a preliminary limit developed for this study based on treatment flow-thru capacity only. Prior to any proposed connection of OCSD to the GCSD treatment system, GCSD's storage and disposal system may need to be analyzed to determine the actual volumetric capacity.

The restriction on day and time operations for the Graton truck receiving station were also considered in the assumed operation of the trucking alternative analyzed in this study.

2.3.1.1 Occidental Equalization Volume Considerations

The operational considerations discussed above, were utilized in evaluating the equalization storage capacity and estimating volumes of required trucking to the Airport WWTP. Due to limited treatment capacity at the Graton WWTP, OCSD would be required to equalize wastewater flows by utilizing existing storage for both the pipeline or trucking alternatives.

OCSD has two existing locations of wastewater storage that could be utilized as equalization: the OCSD lift station and the OCSD treatment plant. At the existing OCSD lift station on Occidental Camp Meeker Road, the potential wastewater storage facilities consist of the converted Imhoff Tank and the converted package plant. At the treatment plant, potential equalization storage includes an aerated pond (Pond No. 2) and a settling pond (Pond No. 1). A summary of the total storage volumes is listed in Table 5.

Table 5 - Equalization Storage Available at Max Daily Flow for Occidental

Storage Location	Volume (gal)
OCSD Lift Station[7]	
Converted Imhoff Tank	16,000
Converted Package Plant	26,000
Total	42,000
OCSD Treatment Plant[8]	
Pond No. 1	220,000
Pond No. 2	650,000
Total	870,000

For the purposes of this feasibility study, it was assumed that the volume of the wet well and the converted package plant will not be used primarily as equalization volume because the volumes of these structures are not large enough to provide sufficient equalization during peak flow periods. The converted Imhoff Tank volume is approximately the volume of the average daily dry weather flow and could be utilized as equalization volume for the normal diurnal flow variations. The converted package plant could be utilized for emergency storage in case of a pumping systems failure (particularly during a power outage) or if the Imhoff Tank was taken out of service for repair or maintenance.

Available long-term equalization storage for the OCSD system was assumed to be the two ponds at the OCSD treatment plant, one with a capacity of 650,000 gallons and the other with the capacity of 220,000 gallons. Based on information from OCSD operational staff, the total usable volume of the storage facilities at the treatment plant is 550,950 gallons. The volume difference between the design and usable storage volumes is accounted for in dead storage below the invert of the pond pipeline connection. The usable volume was utilized in the equalization storage analysis, as this represents current conditions. However, in the future, modifications to the pipeline connections could be made to utilize more of the existing storage.

The development of two water balance models aided in the evaluation of long-term flow equalization and the potential for continued wastewater trucking activities to the Airport WWTP; one model was used for the pipeline alternative and one for the trucking alternative. Both models were run using historical data from three water years, 2016-17, 2018-19 and 2019-20. These three years represent wet, design average and dry weather conditions respectively. The OCSD historical flow data used in the model for 2018-19 and 2019-20 were either partially or completely based on daily trucking volumes and not metered flow. The two models only varied in the operational constraints such as pump run time or number of allowed truck trips. Table 6 contains a summary of the monthly average and maximum daily flow data for OCSD by water year.

Table 6 – OCSD Monthly Average and Maximum Daily Flow Data Summary by Water Year Used in Water Balance

	Water Year					
	2016-17 (Wet)		2018-19 (Design Average)		2019-20 (Dry)	
	Monthly Average	Maximum Daily	Monthly Average	Maximum Daily	Monthly Average	Maximum Daily
October	0.022	0.050	0.013	0.045	0.013	0.058
November	0.028	0.085	0.017	0.067	0.010	0.058
December	0.033	0.094	0.021	0.067	0.030	0.077
January	0.050	0.135	0.036	0.072	0.025	0.080
February	0.054	0.175	0.043	0.129	0.022	0.076
March	0.026	0.052	0.045	0.097	0.015	0.074
April	0.024	0.036	0.033	0.074	0.009	0.038
May	0.014	0.019	0.022	0.055	0.009	0.046
June	0.015	0.017	0.016	0.060	0.009	0.045
July	0.013	0.016	0.025	0.054	0.008	0.038
August	0.015	0.019	0.011	0.046	0.009	0.038
September	0.010	0.011	0.013	0.076	0.008	0.038

The model utilized a "Graton Treatment Threshold" as a control for wastewater transfers to GCSD. Therefore, OCSD would only transfer wastewater (including wastewater from storage) to the Graton WWTP so the total influent flow at the Graton WWTP was at or below the threshold. Once the Graton WWTP cumulative influent flow volume exceeded the threshold, OCSD would cease transfers of wastewater to GCSD and instead transfer excess wastewater to storage until the peak flow event subsided. Based on discussions with GCSD operational staff, the threshold was set at 288,000 gpd. This is below the capacity of the GCSD collection and treatment facilities.

Model results for each alternative are discussed in the corresponding alternative sections.

2.3.2 Cost Considerations

GCSD have established connection and service fees per equivalent single-family dwelling (ESDs). These fees were used as the basis for the cost estimates in this study. OCSD and GCSD both calculate ESDs based on water quality, total suspended solids (TSS) and biological oxygen demand (BOD), and flow. These factors are standardized using a single-family dwelling billing basis and then averaged. GCSD and OCSD calculations differ in the assumed flow and wastewater quality from a single-family dwelling. OCSD reports servicing 273.2 ESDs based on the current connection types per OCSD's ESD definition. The number of equivalent ESDs OCSD represents as defined by GCSD was calculated for the purposes of this study by utilizing the equation below and the data presented in Table 7.

Table 7 – OCSD Wastewater Characteristic and GCSD Single Family Dwelling Data

	Units	OCSD Average Data[9]	GCSD Single Family Dwelling Billing Basis[10]
Total Suspended Solids	mg/L	424	300
Biological Oxygen Demand	mg/L	584	250
Flow	gpd	23,000	150

$$ESDs = \frac{(T * w*0.33)}{(DT * Dw)} + \frac{(BOD* w*0.33)}{(DBOD* Dw)} + \frac{(w*0.34)}{Dw} = \frac{(424*23{,}000*0.33)}{(300*150)} + \frac{(584*23{,}000*0.33)}{(250*150)} + \frac{(23{,}000*0.34)}{150} = 241.9$$

The number of ESDs OCSD represents by the GCSD definition is 241.9 ESDs.

The GCSD equivalent ESD number will be used to calculate the total annual costs to treat wastewater from the OCSD system; however, the proposed service fees calculated are per OCSD ESD.

3. PIPELINE CONSTRUCTION AND OPERATIONS ANALYSIS

3.1 PIPELINE DESIGN CRITERIA

The main pipeline sizing criteria include pumping rate, pump type and flow velocity.

Utilizing a peak pumping factor of 2, the design pumping rate is to be two times the maximum daily flow. Based on the data presented in Section 2.1.2, the maximum daily flow was estimated to be 128,737 gallons per day (gpd) or 89 gallons per minute (gpm). Therefore, the design pumping flow rate is 178 gpm.

As detailed in Section 2.3.1, it is not likely that operationally the Graton WWTP will be able to receive flow from OCSD on the day maximum daily flow occurs; however, by designing around the maximum daily flow, it could allow for potential future volume increases in wastewater transfers. A peak factor of two is applied such that the pumping station would only run for a maximum of 12 hours. On non-peak days, the pumping station would run for fewer hours. With a duplex station (for redundancy), each pump would run for a maximum of 6 hours.

The pipeline will be sized such that the flow will achieve a scouring velocity of 3 feet per second (fps) minimum in the pipe at least once per day for either a gravity pipeline or a pressure pipeline. This is required to re-suspend any settled solids and prevent build up within the pipeline. Additionally, the pipeline should be a minimum of 3-inch nominal for a pressure pipeline, so the solids can be conveyed, minimizing the risk of clogging .

It is assumed that the pump type for the proposed pumping station would be submersible centrifugal grinder pumps. Grinder pumps can process raw sewage without preliminary screening and allow for a smaller diameter force main with less potential maintenance requirements. A minimum of two pumps in parallel would be necessary for redundancy. It is possible that the proposed pumping station would need to be a quadraplex pumping station if two or three pumps running in parallel are necessary for the station to meet the hydraulic design point. The head loss in a 4-inch internal diameter HDPE pipeline at 178 gpm, is approximately 2.24 ft per 100 ft and the initial elevation gain in the alignment profile is approximately 160 ft over a length of approximately 5,500 LF. From the high point on the elevation profile of the force main, the remaining alignment slopes at an average of 2.7 percent as it generally descends to the termination point in Graton. This slope is greater than the head-loss gradient at the design pumping flowrate. Therefore, the pumping station should be capable of conveying 178 gpm at approximately 280 ft of head. A more thorough examination of the system hydraulics would need to be conducted prior to selecting pumps.

Construction would also include installing two 2-inch conduits in a joint trench with the pipeline. These conduits would be utilized for communication and control cabling.

3.1.1 Pipeline Design

3.1.1.1 Pipeline Size

Based on the pipeline design criteria, the pipeline is required to be 4-inch nominal pipe size for a pressure pipeline and 8-inch nominal for a gravity sewer (assuming a minimum of 1 percent slope – see section below). These pipe sizes would allow for the minimum scouring velocity to be met and meet or exceed the normally accepted minimum pipe sizes. For HDPE piping, internal diameter is a function of pressure class and wall thickness. To accommodate a maximum static pressure resulting from the difference between high and low points of the pipeline profile

and to handle varying laying conditions, DR 11 HDPE would likely be recommended. With an ID of 3.63 inches, a pipeline velocity of approximately 5.5 fps would be achieved at the design pumping rate. The designer would need to account for the number of pumps necessary to achieve design pumping rate in selecting final pipe size and pressure class.

3.1.1.2 Pipeline Operational Mode

The operational modes considered in this analysis are gravity, pressure, and a combination gravity/pressure pipeline. The largest consideration between each operational mode is the existing ground surface profile because this informs the required pipeline depth, number of intermediate pumping stations, number of air release valves, and other pipeline design elements. The existing ground surface profile from the pumping station in Occidental to Graton ascends uphill for approximately one mile then generally descends to Graton with a few local high points. A graphical depiction of the existing ground surface profile is included on Exhibits 1 through 4 in Appendix B. The total length of the pipeline is dependent on the alignment but varies from approximately 29,300 ft to 34,400 ft. The various pipeline alternative alignments are depicted on Exhibit 5 in Appendix B.

For an 8-inch gravity sewer, a minimum slope of 1 percent is needed to reach the desired 3 fps velocity at the design pumping rate. Based on the existing ground surface profile of the alignment, it is not feasible to develop a purely gravity pipeline from Occidental to Graton. Therefore, only the pressure and the combination of gravity and pressure alternates are considered further.

For a combination operational mode, two maximum burial depths were considered to identify the required number of intermediate pumping stations. At a maximum burial depth of 25 feet, which is normally considered the deepest a pipeline could be buried without serious construction complications, a minimum of two intermediate pumping stations are required. For a maximum burial depth of 15 feet, a minimum of four intermediate pumping stations are required. The benefit of having a combination gravity and pressure pipeline is that local gravity sewer connection could be accommodated along the gravity portions of the pipeline. The disadvantages with the combination alternative include the larger construction and operational and maintenance costs. Construction is more expensive because of the additional pumping stations, deeper excavations for the gravity sewer and the need to acquire land or easements to construct pumping stations along the pipeline alignment. The operational and maintenance costs are also larger because there would be more staff cost associated with operating the intermediate pumping stations. Additionally, there is more mechanical infrastructure that would need to be maintained and periodically replaced.

The typical minimum burial depth would be 4 feet. Assuming a maximum burial depth of 10 feet, a minimum of 4 air release valve assemblies are required for static air and vacuum release due to local high points in the pipeline. With a maximum burial depth of 15 feet, a minimum of 3 air release valve assemblies are required. Additionally, air release valves are required for dynamic air release on downhill and flat portions of the pipeline every half mile. Air release valve assemblies do add additional cost (approximately $18,000 each); however, the cost of these assemblies is not nearly as much as an intermediate pumping station (approximately $200,000 – $300,000 each) and there is less required land area necessary. Individual grinder pump connections or connections of force mains from other individual pumping stations serving clusters of individual gravity connections could be connected to a pressure force main at any time in the future.

Due to the additional expense of a combination sewer system, it was not considered further, and the pipeline was assumed to be pressure only.

3.2 PIPELINE ALTERNATIVE EQUALIZATION ANALYSIS

The pipeline water balance modeling results were used to evaluate the utility of flow equalization at the OCSD system and the potential necessity for continued wastewater trucking to the Airport WWTP. The model was run using daily historical data from three water years, 2016-17, 2018-19 and 2019-20. These three years represent wet, design average, and dry weather conditions, respectively.

The water balance model assumes that the pumping station would be operated as needed, based on OCSD influent flows and GCSD's ability to receive flows with respect to the established treatment threshold. The design maximum daily delivery flow volume from OCSD to the Graton WWTP was selected to be to OCSD's maximum daily flow. Other limitations built into the water balance model are discussed in Section 2.3.1.1 and detailed below.

- Maximum Daily Delivery from OCSD to GCSD is 128,737 gpd (pumping design rate of 178 gpm over 12 hours per day)
- Graton Treatment Threshold is 288,000 gpd (200 gpm as requested by GCSD officials)
- Available OCSD equalization storage volume is 550,950 gallons (useable volume of Ponds 1 and 2 at the OCSD treatment facility)

During peak flow events, when GCSD can no longer accept flow from OCSD because the GCSD only or combined OCSD/GCSD flows reach or exceed the maximum design limit, OCSD wastewater flows would be lifted to equalization storage at the OCSD treatment plant site using the existing pumping equipment. When there is no storage volume available, trucks would be filled at the OCSD lift station and routed to the Airport WWTP. The model assumes that trucking to the Airport WWTP can continue as is currently operated.

The water balance results for the three design water years are summarized in Table 8.

Table 8 – Pipeline Water Balance Results

	Water Year		
	2016-17 (Wet)	**2018-19 (Design Average)**	**2019-20 (Dry)**
Total Volume Pumped to Graton (MG)	7.9	8.7	5.12
Total Volume Trucked to Airport (MG)	1.3	0.3	-
Total Occidental Wastewater Volume (MG)	9.2	9.0	5.12
Maximum Truck Trips per Day to Airport WWTP	34	19	-
No. of Days Trucking to Airport WWTP	23	6	-

Based on the modeling results a certain amount of trucking wastewater to the Airport WWTP would be required in both an average and a wet year. However, trucking may not be required in a dry year. The results of the modeling were used to develop the projected operation and maintenance cost estimated presented in Section 3.4.3.

3.3 PIPELINE ALIGNMENT

The proposed pipeline alignments are predominately routed along Graton Road from the identified pumping station location in Occidental to one of the proposed pipeline termination locations in Graton. Only one pumping station location in Occidental was identified (see Section 3.3.1) - the existing OCSD lift station site located at 4200 Occidental Camp Meeker Road. Two receiving location alternatives were analyzed in this study and are discussed in Section 3.3.2.

From the existing OCSD lift station site, the pipeline would be routed south on Occidental Camp Meeker Rd to the abandoned railroad right-of-way that is maintained as a non-paved road by Sonoma County. The pipeline would then cross Dutch Bill Creek prior to reaching Graton Road. Then the pipeline would be routed east along Graton Road to Graton. Exhibits 1 through 5 show the proposed alignments.

It is assumed that the majority of the pipeline alignment will be installed in paved public roadway or in the shoulder of public roads (principally Graton Road) to minimize necessary easement acquisition and environmental permitting. The alignment requires four creek crossings – Dutch Bill Creek, Purrington Creek twice, and Atascadero Creek and various crossings of unnamed creeks and drainages. In total, there are three concrete bridge crossings and 11 major culvert crossings along this alignment.

3.3.1 Pumping Station Locations in Occidental

Within the OCSD collection system, there are two locations at which all the wastewater is currently collected into a centralized location: the existing lift station and the OCSD treatment plant. For ease of connection and to limit construction and land costs, the proposed pumping station (to convey flows to Graton) should be located at one of these two locations.

If the proposed pumping station were to be located at the OCSD treatment plant, the existing lift station would be required to convey all the wastewater from the existing gravity collection system instead of just the volume required for flow equalization storage. Also, if the pumping station were located at the OCSD treatment plant, the required pipeline length would be approximately 2,800 lineal feet (LF) longer.

For these reasons, only the existing lift station site was considered for the location of the proposed pumping station.

3.3.1.1 Existing Lift Station

To add the proposed pumping station to this site, submersible centrifugal grinder pumps would be installed within the existing converted Imhoff Tank. Based on as-built drawings, the existing facilities have sufficient space to accommodate the proposed pumping equipment. These pumps would discharge into the proposed pipeline routed as discussed in this section. No additional piping or wet well changes are required to continue to utilize the existing lift station to divert flows to the OCSD treatment plant for equalization purposes. Upgrades to the supervisory control and data acquisition (SCADA) system would need to be implemented to automate and manage operations of the proposed pumping station.

3.3.2 Sewer Receiving Locations in Graton:

Two receiving location alternatives were considered in this study:

Alternative 1: Connection to the Graton Collection System

Alternative 2: Connection to the Graton Wastewater Treatment Plant

Within each of these two alternatives, multiple locations and alignments were considered and are discussed in the following sections.

3.3.2.1 Alternative 1: Connect to Graton Collection System

The advantage to connecting to the GCSD collection system is that the pipeline is not required to be as long as routing the pipeline directly to the Graton WWTP. However, connecting to the GCSD collection system requires the utilization of a portion of the collection system which will potentially impact the available hydraulic capacity and could result in a higher connection fee and additional operation and maintenance costs. These costs are estimated in Section 3.4.3.

Two termination locations were considered as possible connection points to the GCSD collection system.

Alternative 1A: Terminate at Exiting Manhole MH 5-10

Alternative 1B: Terminate at Existing Manhole MH 3-2

As discussed in Section 2.2.1, sections of the GCSD collection system were found to have moderate capacity issues according to the Demonstration Project. The hydraulic analysis performed found that during peak flow events, portions of the section of the trunk sewer from MH3-2 to the GCSD WWTP were flowing at approximately 85 percent capacity. All the sub-alternatives under Alternative 1 would utilize the portion of the GCSD collection system that is nearly at capacity. The flow capacity of these pipeline segments is the same as the treatment capacity of the Graton WWTP, or 0.85 MGD. Therefore, pumping from OCSD would not occur during peak flow events.

Alternative 1A: Terminate at Existing Manhole MH 5-10

The proposed pipe routing for Alternative 1A is along Graton Road to just west of Ross Road turning north through the West County Trail Parking Lot and terminating at MH 5-10.

This pipeline routing is the shortest required length with a total length of approximately 29,300 lineal feet. This alternative utilizes the largest proportion of the Graton collection system compared to any of the alternatives. This termination location is upstream of Lift Station No. 1 and therefore this lift station would pump the additional flow from Occidental, which would proportionally increase operational costs (power) and have a slight impact to maintenance costs.

In addition to the previously discussed collection system deficiencies as identified in the Demonstration Project, infiltration and root intrusion was identified between MH 5-11 and Lift Station No. 1 and a cured-in-place pipe (CIPP) lining project was proposed for the 340 linear feet of existing 12-inch diameter sewer line. It is assumed that this capital improvement project would not be required to allow the connection of the proposed pipeline from OCSD.

The environmental requirements associated with the pipeline alternatives are detailed in Section 3.3.5. The associated construction and operation costs for this alternative are detailed in Section 3.4.

Alternative 1B: Terminate at Existing Manhole MH 3-2

The proposed pipe routing for Alternative 1B is along Graton Road turning north along Ross Road and terminating at MH 3-2. MH 3-2 is the location of the discharge of the existing force main from Lift Station No. 1.

Of the two collection system termination alternatives, this alternative utilizes a smaller proportion of the collection system as the termination location is downstream of Lift Station No. 1. However, this alignment alternative requires approximately 2,645 LF more force main pipeline than Alternative 1A. The total pipeline length of Alternative 1B is approximately 31,945 LF.

The environmental requirements associated with the pipeline alternatives are detailed in Section 3.3.5. The associated construction and operation costs for this alternative are detailed in Section 3.4.

3.3.2.2 Alternative 2: Terminate at Graton Wastewater Treatment Plant

Two alignment alternatives to route the force main directly to the Graton Wastewater Treatment Plant (Graton WWTP) were considered as possible sub-alternatives.

Alternative 2A: Parallel to the Existing Gravity Trunk Sewer Alignment

Alternative 2B: West County Trail Alignment

The Graton WWTP is located at 250 Ross Lane in Sebastopol. The pipeline for both of these alternatives would terminate at the headworks and would not utilize any of the Graton collection system, eliminating any potential collection system capacity issues or the requirement to pay a collection system connection fee.

Alternative 2A: Parallel to Existing Gravity Sewer Alignment

The proposed pipe routing for Alternative 2A is along Graton Road to Ross Road. The pipeline would then be routed along Ross Road, across Green Valley Road to the utility easement utilized for the existing gravity trunk sewer. The pipeline would then parallel the existing gravity sewer to the Graton WWTP headworks.

This alternative does not utilize any of the Graton collection system, therefore not impacting operation and maintenance costs of the collection system. It also follows the established utilities easement and therefore may not require additional easement from private property. However, the existing utilities easement already has two utilities installed within the boundary including a 12-inch gravity trunk sewer and a natural gas main. Additionally, there would be temporary landscaping disruptions required to install an additional utility within the existing easement. This alternative includes approximately 5,100 LF more force main pipeline than Alternative 1A. The total pipeline length of Alternative 2A is approximately 34,400 LF and is the longest pipeline length of all four alternatives.

The environmental requirements associated with the pipeline alternatives are detailed in Section 3.3.5. The associated construction and operation costs for this alternative are detailed in Section 3.4.

Alternative 2B: West County Trail Alignment

The proposed pipe routing for Alternative 2B is along Graton Road to Sullivan Road. The pipeline would then be routed along Sullivan Road north to Green Valley Rd, then along Green

Valley Road east to the West County Trail. The pipeline would then follow the trail and terminate at the Graton WWTP headworks.

Routing the pipeline along the trail would include utilizing horizontal directional drilling to install the pipeline and conduits in the wetlands adjacent to Atascadero Creek. This alternative has the largest potential environmental impact of any of the pipeline alignment alternatives and could be unpopular in public opinion due to the impacts to the West County Trail during construction. Alternative 2B would potentially require additional permits from the U.S. Army Corp of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and National Marine Fisheries Service because some construction operations would be occurring within or adjacent to wetlands with endangered species habitat. These permits may require construction to occur during the driest part of the year and observation by a biologist during construction. Fish and other wildlife surveys including but not limited to bats, birds, and frogs would need to be completed prior to construction. The other environmental requirements associated with all pipeline alternatives are detailed in Section 3.3.5.

This alternative includes approximately 3,555 LF more pipeline than Alternative 1A. The total pipeline length of Alternative 2B is approximately 32,855 LF.

The associated construction and operation costs for this alternative are detailed in Section 3.4.

3.3.3 Public Right-Of-Way and Easement Information

The County of Sonoma has existing public right-of-way for most of the alignment which would allow for the proposed pipeline to be built without obtaining any additional easements. However, there are a few locations along Graton Road and the West County Trail where the public right-of-way is in question.

A review of existing right-of-way record maps and RealQuest Professional public records database revealed that two locations along Graton Road potentially do not have existing public right-of-way and may require an easement to build the pipeline. The length of the right-of-way in question is a total of approximately 370 feet. These locations are indicated on Exhibit 1 and 4. One of these locations is common to all four alignment alternatives and the other location is common only to Alternatives 1A, 1B and 2A. Additional research should be performed prior to construction to determine the exact easement requirements.

Additionally, the County of Sonoma does not have a utilities easement on the West County Trail. Utility easements would be required for one property along the West County Trail just north of Graton Road for Alternative 1A and two properties along the West County Trail just north of Green Valley Road for Alternative 2B.

3.3.4 Geotechnical Evaluation

A windshield geotechnical survey was performed along the proposed pipeline alignment, the majority of which was along Graton Road. At various locations along the alignment, large blocks of hard Franciscan rock formations were observed. In a few select locations, unstable embankments and Wilson Grove sandy formations were observed.

- Franciscan rock formations consist of greywacke sandstones, shales, and conglomerates that have experienced low-grade metamorphism.

- Wilson Grove Formation consists of unconsolidated fine-grained, massive sand, and minor amounts of gravel and tuff deposited under beach and shallow marine conditions.

These noted geological formations and unstable embankments do not preclude the ability to construct the pipeline. However, it does inform where within the roadway the pipeline would need to be aligned. It was concluded from the geotechnical evaluation that the pipeline can be aligned along the proposed pipeline alignment, but that the pipeline will need to cross the road in various locations to avoid hard rock formations and that in certain locations the pipeline may need to be aligned along the center of the road. The largest project cost impact is that in the areas where the alignment will be in the center of the road, more pavement restoration will be required, and traffic control may be more complicated when the pipeline must cross from one side of the road to the other.

3.3.5 Environmental Requirements

Required environmental documents for the proposed pipeline project consist of California Environmental Quality Act (CEQA) documents, potentially requiring an Environmental Impact Report (EIR). For construction of any of the four pipeline alignment alternatives, permits from the Regional Water Quality Control Board and the California Department of Fish and Wildlife would need to be obtained for the bridge crossings. Additionally, 404 Clean Water Act permits, and possible Federal Endangered Species Act (ESA) and California ESA consultations may be required. These permits would require certain system design elements including automatic pump shut off, double containment and valving to limit the risk of surface water contamination. Alternative 2B would potentially require additional permits from the U.S. Army Corp of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and National Marine Fisheries Service because some construction operations would be occurring within or adjacent to wetlands with endangered species habitat. These permits require construction occur during the driest part of the year and observation by a biologist during construction. Fish and other wildlife surveys including but not limited to bats, birds, and frogs would need to be completed prior to construction.

3.4 PIPELINE COST ESTIMATE

The pipeline cost estimate analysis includes the estimation of construction costs, connection fee cost, operation and maintenance costs, and a present worth analysis contained within the following sections.

3.4.1 Construction Cost Estimate

A construction cost estimate for each of the pipeline alignment alternatives is listed in Table 9. These cost estimates include capital costs only, except for the environmental costs unique to a particular alternative. The construction costs do not include engineering and planning costs such as design, CEQA document preparation, environmental permitting, public outreach, connection fee, right of way determination, easement document preparation, easement acquisition, and construction inspection.

Table 9 – Pipeline Alternative Capital Cost Estimate

Description	1A	1B	2A	2B	Units	Unit Cost	Total 1A	Total 1B	Total 2A	Total 2B
Mobilization and Demobilization	5%	5%	5%	5%	-	Total Construction Cost	$345,000	$375,000	$396,000	$406,000
Grinder Pumping Equipment Installed at OCSD Lift Station Site	1	1	1	1	LS	$300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
SCADA Additions at OCSD Lift Station Site	1	1	1	1	LS	$100,000	$100,000	$100,000	$100,000	$100,000
4-inch HDPE Force Main with Installation	29,300	31,945	34,400	30,695	LF	$100	$ 2,930,000	$ 3,195,000	$ 3,440,000	$ 3,070,000
Communication Conduits – (2) 2-inch with pull-boxes	29,300	31,945	34,400	30,695	LF	$25	$733,000	$799,000	$860,000	$767,000
Air Release Valve Installations	10	12	13	12	EA	$18,000	$ 180,000	$ 216,000	$ 234,000	$ 216,000
Pavement Restoration	28,830	31,475	32,490	28,065	LF	$60	$ 1,730,000	$ 1,889,000	$ 1,949,000	$ 1,684,000
Traffic Control - Graton Rd	28,380	28,380	28,380	24,795	LF	$30	$ 851,000	$ 851,000	$ 851,000	$ 744,000
Traffic Control - Green Valley Rd	-	-	70	2,290	LF	$30	$ -	$ -	$ 2,000	$ 69,000
Traffic Control - Sullivan Rd	-	-	-	2,790	LF	$25	$ -	$ -	$ -	$ 70,000
Traffic Control - Ross Rd	-	2,890	4,260	-	LF	$25	$ -	$ 72,000	$ 107,000	$ -
Bridge Crossings	3	3	3	3	EA	$20,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000
Culvert Crossings	11	11	12	11	EA	$1,000	$ 11,000	$ 11,000	$ 12,000	$ 11,000
Horizontal Directional Drilling under Atascadero Creek and through wetland area	-	-	-	2,160	LF	$450	$ -	$ -	$ -	$ 972,000
Environmental Monitoring and Special Construction Permits	-	-	-	1	LS	$50,000	$ -	$ -	$ -	$ 50,000
Subtotal Capital Cost							**$7,240,000**	**$7,868,000**	**$8,310,000**	**$8,519,000**
Construction Contingency (30%)							**$2,172,000**	**$2,361,000**	**$2,493,000**	**$2,556,000**
Total Estimated Capital Cost (in 2022 dollars, ENR CCI=13110.50)							**$9,412,000**	**$10,229,000**	**$10,803,000**	**$11,075,000**

3.4.2 Connection Fee Cost Estimate

GCSD currently charges a new customer $10,352 per ESD to connect to the system. For Alternative 2 pipeline alignments, OCSD will not be connecting to the Graton collection system as wastewater would be transferred directly to the Graton WWTP. Alternative 1 alignments do include connecting to and utilizing portions of the GCSD collection system. Therefore, it is suggested that OCSD pay the full connection fee for Alternatives 1A and 1B and only pay a connection fee for treatment for Alternatives 2A and 2B. It should be noted that the same collection system component connection fee was used for both Alternatives 1A and 1B despite 1A involving use of more of the collection system including the main Graton lift station.

The proposed connection fee for Alternatives 1A and 1B would be OCSD's equivalent ESDs multiplied by the full new customer connection fee, which would be approximately $2,504,000

($10,352/ESD x 242 ESDs). The proposed connection fee for Alternatives 2A and 2B would be to pay two thirds of the new customer connection fee based on OCSD's equivalent ESDs, which is approximately $1,670,000 (241.85($10,352/ESD x 242 ESDs x 2/3).The connection fees for Alternatives 2A and 2B were based on the assumption that because GCSD calculates ESDs based on a weighted average of TSS concentration, BOD concentration, and flow, that approximately one third of the ESD calculation represents collection (flow) and two thirds represents treatment (TSS and BOD).

OCSD could fund a capital improvement plan (CIP) project for GCSD as an alternative to paying all or some of the traditional connection fee. One potential CIP project that could be funded instead of paying a connection fee would be to replace the 12-inch trunk sewer with a new 15-inch trunk sewer from MH 3-2 to the treatment plant. This project was identified in the Demonstration Project as a high priority project because it is near capacity at GCSD's current flows. By upsizing this sewer main, OCSD would be providing GCSD with the collection system capacity they currently need during peak flow events. This alternative would be most appropriate for implementation of Pipeline Alternative 1B.

The connection fee would need to be negotiated between OCSD and GCSD to determine the amount of the fee and the possibility of replacing or augmenting the fee with the funding of a CIP project. Once the total annual volumetric amount of wastewater GCSD is able to accept from OCSD is finalized, the connection fee could be negotiated such that OCSD only pays for the equivalent ESDs that GCSD will be collecting and treating instead of the connection fee based on the total approximately 242 ESDs as presented in this section.

3.4.3 Operation and Maintenance Cost Estimate

The operation and maintenance costs (O&M) for the pipeline alternative were developed with the assumption that GCSD would take over complete operation and maintenance of the OCSD collection system, including the OCSD unique facilities such as the existing lift station and storage basins, the proposed pumping station, and pipeline. The estimates also assume that any required trucking to the Airport WWTP would be performed either by GCSD staff or by a contractor.

GCSD's current staff rates average approximately $55 per hour whereas OCSD staff rates average approximately $150 per hour. The cost associated with the contractor trucking wastewater to the Airport is $0.10 per gallon. GCSD currently charges a base rate of $1,574 per year per ESD. It was assumed that GCSD staff would be able to operate and maintain the OCSD collection system and treat the waste at the same rate as they operate and maintain the Graton collection system and treatment system. Therefore, the estimate for annual O&M costs of the OCSD Collection System by GCSD staff and treatment of the wastewater at the Graton WWTP, standard services, would be the GCSD base rate for the equivalent number of ESDs. There are additional, unique, O&M costs associated with the OCSD system that are not included in that base rate and an estimate for the O&M cost of those unique facilities was added.

The last part of the O&M cost estimate is the depreciation of the OCSD facilities excluding the depreciation of the collection system. The collection system depreciation was excluded as it is assumed that there is collection system depreciation included in the GCSD base rate that would cover potential future improvements. The non-collection system depreciation estimates were made based on current depreciation information provided by Sonoma Water plus the estimated depreciation for the proposed pipeline and pumping station facilities. The depreciation for the proposed facilities was estimated using the straight-line method assuming a 50-year useful life. The

estimated annual operation and maintenance costs for the pipeline alternative for wet, design average, and dry years are listed in Table 10.

Table 10 – Pipeline Alternative Annual Operation and Maintenance Cost Estimate

	Wet	Design Average	Dry
	16-17 WY	18-19 WY	19-20 WY
O&M of OCSD Collection System by Graton Staff	$ 127,000	$ 127,000	$ 127,000
Treatment of Wastewater at Graton Treatment Plant	$ 254,000	$ 254,000	$ 254,000
Operation of OCSD Storage, Pumping Station and Pipeline	$ 43,000	$ 43,000	$ 43,000
Trucking to Airport (Graton Staff)	$ 63,000	$ 13,000	$ -
Trucking to Airport (Contractor)	$ 8,000	$ -	$ -
Treatment of Wastewater at Airport Treatment Plant	$ 30,000	$ 6,000	$ -
Depreciation	$ 200,000	$ 200,000	$ 200,000
Estimated Total Annual O&M Cost	**$ 725,000**	**$ 643,000**	**$ 624,000**

The proposed service fee was calculated by taking the average year total annual operation and maintenance cost, presented in Table 10 – Pipeline Alternative Annual Operation and Maintenance Cost Estimate and dividing by the number of OCSD ESDs, approximately 273. The proposed service fee is therefore $2,354 per OCSD ESD. This service fee is for operation and maintenance costs only and does not include the amortization of the connection fee or the capital cost of any system improvements. The impact of having to amortize these other additional costs are discussed in Section 5.

The benefits for GCSD of taking over the operation and maintenance associated with the pipeline alternative include an increase GCSD's user base, increasing revenue without proportionally increasing treatment and operation costs. The relatively fixed costs associated with administration, permitting and testing would also be distributed among more users.

3.4.4 Present Worth Analysis

To compare the different pipeline alinement alternatives, a 20-year present worth analysis was performed. The interest rate used is 0.3% according to the November 2020 OMB Circular No. A-94 Appendix C for Real Interest Rates on Treasury Notes and Bonds of Specified Maturities for a 20-year period. Table 11 lists the present worth of each pipeline alternative utilizing the design average year for operation and maintenance costs.

Table 11 - Present Worth Analysis for WY 18-19

	Pipeline Alternative			
	1A	1B	2A	2B
Capital Cost Estimate	$ 9,412,000	$ 10,228,400	$ 10,803,000	$ 11,074,700
Connection Fee	$ 2,504,000	$ 2,504,000	$ 1,670,000	$ 1,670,000
Annual O&M Cost Estimate	$ 643,000	$ 643,000	$ 643,000	$ 643,000
Total Present Worth Cost Estimate	$ 25,023,000	$ 25,839,000	$ 25,579,000	$ 25,851,000

Construction costs associated with Alternative 1A is the least expensive and Alternative 2B is the most expensive. However, because of the additional connection fee cost component for Alternatives 1A and 1B, the present worth cost for all for alternatives are within $830,000. Alternative 1A has the lowest present worth cost and Alternative 2A is the next lowest.

4. TRUCKING ANALYSIS

4.1 EXISTING AIRPORT TRUCKING OPERATIONS

OCSD began trucking wastewater to the Airport WWTP in January 2019. OCSD rents and operates two trucks that they utilize on a regular basis from Sonoma Water. Wastewater is trucked from the existing trucking station at the lift station site located on Occidental Camp Meeker Road to the receiving station at the Airport WWTP. Typically trucking occurs between 2 and 5 days per week to economize multiple full truck load(s) on a single day instead of few or partial truck loads every day. A truck load typically is 3,800 gallons. Existing trucking operations to the Airport WWTP, allow for trucking Monday through Friday from 7 AM to 5 PM (and at other times during emergencies and with prior notification of surrounding residents) with no weekly truck limit. Since trucking began, the most trucks loads required in a single day was 35 trucks load on February 27, 2019. This was due to the high collection system flows due to significant precipitation events during that period.

4.1.1 Existing Airport Trucking Cost

OCSD provided the revenue and operating expenses for fiscal years 2018/19, 2019/20 and 2020/21. Expenses in 2018/19 were unusually high due to the construction of the trucking infrastructure. The average expenses for the other two fiscal years is approximately $1,290,000.

A cost estimate, developed using the same water balance model and assumptions as the other alternatives for wet, average and dry years, was used to estimate the existing Airport trucking operations and is presented in Table 12. Historical operation and maintenance expenditures for OCSD were utilized to develop the cost estimate and are presented similarly to the estimate presented in 4.2.3.3 for comparison. The labor cost for OCSD staff was assumed to be $150 per hour and the cost for contractor trucking was assumed to be $0.10 per gallon based on existing agreements. Certain assumptions about operations of the collection system and the treatment of wastewater at the Airport WWTP were made so that the expenditures in the average year were approximately the same as the actual fiscal records.

Table 12 – Existing Airport WWTP Trucking Alternative Annual Operation and Maintenance Cost Estimate

	Wet	Average	Dry
	16-17 WY	18-19 WY	19-20 WY
O&M of OCSD Collection System and Pumping Station	$ 223,000	$ 223,000	$ 223,000
Treatment of Wastewater at Airport Treatment Plant	$ 200,000	$ 200,000	$ 200,000
Operation of OCSD Storage	$ 6,000	$ 6,000	$ 6,000
Trucking to Airport (OCSD Staff)	$ 784,000	$ 788,000	$ 453,000
Trucking to Airport (Contractor)	$ 63,000	$ 15,000	$ -
Depreciation	$ 75,000	$ 75,000	$ 75,000
Estimated Total Annual O&M Cost	**$ 1,351,000**	**$ 1,307,000**	**$ 957,000**

4.2 GRATON TRUCKING ALTERNATIVE

The Graton Trucking Alternative would involve trucking OCSD wastewater primarily to GCSD and trucking to the Airport WWTP only during periods that Graton is unable to receive wastewater from OCSD.

4.2.1 Equalization Capacity and Trucking Frequency

The trucking water balance modeling results were used to evaluate the utility of flow equalization at the OCSD system, frequency of trucking to GCSD, and the potential for continued wastewater trucking to the Airport WWTP. The model was run using historical data from three water years, 2016-17, 2018-19, and 2019-20. These three years represent wet, design average, and dry weather conditions respectively.

For the water balance model, it was assumed that trucking to GCSD only occurs Monday through Friday from 7 AM to 5 PM (10-hour window of time) based on the 2021 Initial Study. It was also assumed that a maximum of 30 trips per week could occur.

During peak flow events, when GCSD can no longer accept flow from OCSD, trucks would be routed to the Airport WWTP. It was assumed trucking to the Airport WWTP can occur as currently operated. It was also assumed that one round-trip from OCSD to the Airport WWTP would take a total of 1 hour 40 mins, for a maximum of 14 trips per day per truck. Sonoma Water currently owns two trucks. During peak flow events OCSD contracts with a local trucker for two additional trucks. With a maximum of 4 trucks operating concurrently, the model limits total truck trips to the Airport in one day to 56.

A Graton treatment flowrate threshold was assumed in the calculations as an operational constraint of the GCSD treatment plant. Additionally, an available OCSD storage volume of 550,950 gallons was utilized in the modeling to estimate required trucking volumes. The explanation of the functionality of the Graton Treatment Threshold and the description of the available storage is in Section 2.3.1.1.

The water balance results for the three design water years are summarized in Table 13.

Table 13 – Trucking to GCSD Water Balance Modeling Results

	Water Year		
	2016-17	**2018-19**	**2019-20**
Total Volume Trucked to Graton (MG)	5.2	5.2	4.7
Total Volume Trucked to Airport (MG)	4.0	3.8	0.4
Total Volume Trucked (MG)	9.2	9.0	5.1
Maximum Truck Trips per Day to Airport WWTP	46	34	15
No. of Days Trucking to Airport WWTP	112	92	15

Based on the modeling results, as presented in Table 13, trucking wastewater to the Airport would be required in both an average and a wet year but would be considerably less or may not be required in a dry year. The results of the modeling were used to develop the O&M cost estimated presented in Section 3.2.3.3.

4.2.2 Proposed New Facilities

The proposed truck receiving station in Graton has been detailed in the Occidental Wastewater Transport and Treatment Project Recirculated Initial Study/Proposed Mitigated Negative Declaration SCH No. 2019119006 (Initial Study) and is summarized in Section 2.2.3. This proposed facility was determined to be the only new infrastructure required to implement the trucking to GCSD alternative. The truck receiving station improvements are summarized below.

4.2.3 Graton Trucking Cost Estimate

The costs associated with the GCSD Trucking alternative include the initial capital costs, the proposed connection fee, and on-going operation and maintenance costs.

4.2.3.1 Construction Cost Estimate

The description in the proposed new facilities described in the Initial Study and summarized in Section 2.2.3 was used in the development of the construction cost estimate for the GCSD Trucking alternative. The total capital cost is estimated to be approximately $478,000 and the details of that cost estimate are listed in Table 14.

Table 14 – GCSD Trucking Alternative Capital Cost Estimate

Description	Total
Mobilization and Demobilization	$ 18,000
Receiving Station, Plumbing and Sewer Lateral Connection	$ 175,000
Concrete Driveway	$ 50,000
Paving and Traffic Striping	$ 20,000
Electrical Controls	$ 40,000
Retaining Wall	$ 35,000
Storm Drain Reconstruction	$ 30,000
Subtotal Capital Cost	**$ 368,000**
Construction Contingency (30%)	**$ 110,000**
	$ 478,000

The construction costs do not include engineering and planning costs such as design, public outreach, connection fee, and construction inspection.

4.2.3.2 Connection Fee Cost Estimate

Even though the overall capacity of the GCSD collection system would not be impacted by the connection of OCSD through the truck receiving station because of the equalizing of wastewater flows and trucking of wastewater to the Airport WWTP during peak flow events, the trucking to Graton alternative does include connecting to and utilizing a portion of the GCSD collection system. It is suggested that OCSD pay the full connection fee for the trucking to Graton alternative.

The proposed connection fee for the trucking to Graton alternative would be to pay the typical connection fee based on OCSD's equivalent ESDs which is approximately $2,504,000 ($10,352*241/ESD x 242 ESDs).

OCSD could fund a capital improvement plan (CIP) project for GCSD as an alternative to paying all or some of the traditional connection fee. One particular CIP project that could be funded instead of paying a connection fee would be to replace the 12-inch trunk sewer with a new 15-inch trunk sewer from MH 3-2 to the treatment plant. This project was identified in the Demonstration Project as a high priority project because it is near capacity at GCSD's current flows. By upsizing this sewer main, OCSD would be providing GCSD with the collection system capacity they currently need during peak flow events.

The connection fee would need to be negotiated between OCSD and GCSD to determine amount of the fee and the possibility of replacing or augmenting the fee with the funding of a CIP project. Once the total annual volumetric amount of wastewater GCSD is able to accept from OCSD is finalized, the connection fee could be negotiated such that OCSD only pays for the equivalent ESDs that GCSD will be collecting and treating instead of the connection fee based on the total approximately 242 ESDs as presented in this section.

4.2.3.3 Operation and Maintenance Cost Estimate

In developing the operation and maintenance (O&M) costs for the GCSD trucking alternative it was assumed that GSCD would take over complete operation and maintenance of the OCSD collection system including the OCSD unique facilities such as the storage and the truck receiving station. It was also assumed that any required trucking to the Airport WWTP would either be performed by GCSD staff or by a contractor.

Current GCSD staff rate of approximately $55 per hour was utilized to estimate operation and maintenance expenses. The cost associated with the contractor trucking wastewater to the Airport WWTP is $0.10 per gallon. The operational assumptions associated with the Graton truck receiving station are such that all trucking can be performed by GCSD staff and therefore there is no need to estimate the associated cost per gallon for a contractor to truck wastewater to the Graton WWTP. The same method described for the pipeline alternative in Section 3.4.3 was utilized in the development of the estimate for annual costs associated with operation and maintenance of the OCSD Collection System by GCSD Staff, the treatment of the wastewater at the Graton WWTP, the operation of unique OCSD facilities, and depreciation for those unique OCSD facilities. The estimated annual operation and maintenance costs for the GCSD Trucking alternative for a wet, design average and dry years are listed in Table 15.

Table 15 – GCSD Trucking Alternative Operation and Maintenance Costs

	Wet	Average	Dry
	16-17 WY	18-19 WY	19-20 WY
O&M of OCSD Collection System by Graton Staff	$ 127,000	$ 127,000	$ 127,000
Treatment of OCSD Wastewater at Graton Treatment Plant	$ 254,000	$ 254,000	$ 254,000
Operation of OCSD Storage	$ 20,000	$ 20,000	$ 20,000
Trucking to Graton (Graton Staff)	$ 92,000	$ 92,000	$ 83,000
Trucking to Airport (Graton Staff)	$ 182,000	$ 180,000	$ 13,000
Trucking to Airport (Contractor)	$ 33,000	$ 9,000	$ -
Treatment of Wastewater at Airport Treatment Plant	$ 89,000	$ 85,000	$ 10,000
Depreciation	$ 85,000	$ 85,000	$ 85,000
Estimated Total Annual O&M Cost	**$ 882,000**	**$ 852,000**	**$ 592,000**

The proposed service fee was calculated by taking the average year total annual operation and maintenance cost, presented in Table 15 and dividing by the number of OCSD ESDs (approximately 273). The proposed service fee is therefore $3,119 per OCSD ESD. This service fee is for operation and maintenance costs only and does not include the amortization of the connection fee or capital costs. The impact of having to amortize these other additional costs are discussed in Section 5.

4.2.3.4 Present Worth Analysis

To compare the different alternatives, a 20-year present worth analysis was performed. The interest rate used is 0.3% according to the November 2020 OMB Circular No. A-94 Appendix C for Real Interest Rates on Treasury Notes and Bonds of Specified Maturities for a 20-year period. Table 16 lists the present worth of the Trucking to Graton alternative utilizing the design average year for operation and maintenance costs.

Table 16 – GCSD Trucking Alternative Present Worth Analysis for Design Average Year

	Estimated Cost
Capital Cost Estimate	$ 350,000
Connection Fee	$ 2,504,000
Annual O&M Cost Estimate	$ 852,000
Total Present Worth Cost Estimate	$ 20,348,000

4.3 EXISTING TRUCKING TO AIRPORT AND GRATON TRUCKING ALTERNATIVE COMPARISON

The main benefit of the existing Trucking to the Airport alternative is that there is less of a limitation on the trucking operations than there is for the Graton Trucking Alternative in terms of total number of trucks per week (limited to 30 per week for the Graton Trucking Alternative).

The main benefit of the GCSD trucking alternative is the estimated operation and maintenance costs savings because of the shorter trucking distance and lower labor costs. The driving distance between OCSD and the Airport WWTP is over twice as far as the driving distance to the GCSD

WWTP. The longer trucking distance (with the associated staff time per truck trip) and the continued operation of the OCSD system by OCSD staff (which have higher labor rates) lead to higher operational costs as compared to the Graton Trucking Alternative. The O&M costs are estimated to be approximately half of the existing costs. The shorter trucking distance also reduces the greenhouse gas emissions associated with trucking the wastewater.

The additional disadvantage of the Graton Trucking Alternative is that during peak flow events, GCSD does not have sufficient treatment capacity to receive all OCSD wastewater flows. Therefore, between the limitation on operational hours and wastewater volumes, OCSD must utilize the existing storage at the OCSD treatment plant for equalization and in wet and average years, during peak flow event, wastewater flows will need to be trucked to the Airport WWTP.

The benefits for GCSD assuming the operation and maintenance associated with the GCSD trucking alternative is that it would prolong the time before GCSD may need to increase user rates. Taking on OCSD would increase the user base with an associated increase in revenue without proportionally increasing treatment costs and the relatively fixed costs associated with administration, permitting, and testing would be spread out among more users. Additionally, GCSD would receive the connection fee payment or a proposed CIP project, depending on a specific negotiated agreement. A connection fee could be used to complete a CIP project or go towards treatment plant upgrades and constructing a CIP project would free up current funds earmarked for that project for other upgrades.

5. PIPELINE AND TRUCKING COMPARISON ANALYSIS

A present worth cost comparison of the pipeline and trucking alternatives is presented in Table **17**.

Table 17 **– Present Worth Cost Comparison of Trucking and Pipeline to Graton Alternatives**

	Trucking Alternatives		Pipeline Alternative			
	Existing Trucking to Airport Alternative (No Action Alternative)	**Trucking to Graton Alternative**	**Alternative 1A**	**Alternative 1B**	**Alternative 2A**	**Alternative 2B**
Capital Cost Estimate	$ -	$ 478,000	$ 9,412,000	$ 10,228,000	$ 10,803,000	$ 11,075,000
Treatment Plant Connection Fee	$ -	$ 1,670,000	$ 1,670,000	$ 1,670,000	$ 1,670,000	$ 1,670,000
Collection System Connection Fee	$ -	$ 834,000	$ 834,000	$ 834,000	$ -	$ -
Annual O&M Cost Estimate	$ 1,307,000	$ 852,000	$ 643,000	$ 643,000	$ 643,000	$ 643,000
Total Present Worth Cost Estimate	$ 26,642,000	$ 20,348,000	$25,023,000	$ 25,838,000	$ 25,578,000	$ 25,850,000

The existing O&M of the OCSD system is the most expensive alternative and has the greatest total present worth. Conveying wastewater to GCSD either through a pipeline or a truck receiving station are more feasible alternatives, as the total present worth cost estimate for either of these alternatives is less.

The capital cost of the pipeline alternative is approximately 16 times more than that of the Graton trucking alternative as the infrastructure for the pipeline alternative is much more extensive. However, if there is an opportunity to acquire public funding for the capital costs associated with either alternative (which would not require the capital cost to be amortized into the service fee), the pipeline alternative would be more feasible with its lower O&M cost.

The connection fee for both the pipeline Alternatives 1A and 1B and the GCSD trucking alternative would theoretically be the same. The connection fee for pipeline Alternatives 2A and 2B is only for treatment and does not include a collection system connection fee component. For any of these alternatives the fee could potentially be replaced or augmented with the financing of a CIP project. The benefit of constructing a CIP project instead of a one-time payment is that a project could be much more easily funded through public grants.

The annual O&M costs associated with both alternatives are less expensive than the existing Trucking to the Airport WWTP Alternative. The pipeline alternative annual operation and maintenance cost estimate is less than the annual operation and maintenance cost estimate for the Graton trucking alternative.

The overall alternative with the lowest present worth is the Trucking to Graton Alternative and the Pipeline Alternative with the lowest present worth is Alternative 1A.

Table 18 lists the estimated annual OCSD customer sanitation rates for both alternatives with the different scenarios of cost amortization.

Table 18 – Estimated Annual OCSD Customer Sanitation Rates

Service Fee	Trucking to Graton Alternative Estimate	Pipeline Alternative 1A Estimate	Pipeline Alternative 1B Estimate	Pipeline Alternative 2A Estimate	Pipeline Alternative 2B Estimate
Service Fee - O&M Cost Only	$ 3,119	$ 2,354	$ 2,354	$ 2,354	$ 2,354
Service Fee - O&M Cost and Collection System Connection Fee Only	$ 3,529	$ 2,559	$ 2,559	$ 2,354	$ 2,354
Service Fee - O&M Cost and Full Connection Fee Only	$ 3,735	$ 2,970	$ 2,970	$ 2,764	$ 2,764
Service Fee - O&M Cost, Capital Cost and Full Connection Fee	$ 3,852	$ 5,285	$ 5,486	$ 5,422	$ 5,489

The current OCSD customer service fee is $2,604 per ESD per year. The service fee based solely on O&M costs and the service fee based on O&M and the financed collection connection fee only for the pipeline alternative is less than the existing service fee. However, if the full connection fee or the capital cost for any alternative is amortized into the rates, a rate increase would be required.

It was assumed that GCSD would not implement a customer sanitation rate change when OCSD connected to the system, either by pipeline or truck receiving station. The benefit of connecting OCSD to GCSD is increased revenue while only marginally increasing the operational costs. This could delay the need for GCSD to raise sewer service charges in the near future.

As OCSD customer rates are already high compared to other local rates, an alternative that results in a rate increase is not desirable. If a minimum of 91 percent of the capital costs and connections fees (100 percent of capital costs and 60 percent of connection fees for example) are funded through public grant programs and other non-ratepayer sources, the service fee would be at or below the current service fee for the Pipeline Alternatives.

A minimum of approximately 50 percent of the pipeline capital costs would need to be funded through public grant programs and other non-ratepayer sources for the pipeline alternative to have the a lower present worth cost than the Trucking to Graton Alternative. If this funding condition is met, the preferred alternative is the pipeline alternative with the lowest present worth, Pipeline Alternative 1A. Although Pipeline Alternative 1A is the preferred alternative based on the analysis presented in this report, during design in conjunction with negotiations regarding connection fees, further refinement of the pipeline alignment should be performed to select the best alternative.

If at least 50 percent of the capital costs and connection fees are not funded, then the Pipeline Alternatives would not have the lowest net present worth, resulting in the preferred alternative to be the Trucking to Graton Alternative. However, under any financing situation, the Trucking to Graton Alternative would result in an increase in service fee.

GCSD would financially benefit by taking over the operation and maintenance of the OCSD for either the pipeline or trucking alternatives. OCSD rates would be structured such that OCSD users pay for standard services (collection system operation and maintenance and wastewater treatment and disposal) at the same rate as GCSD users. Additional costs unique to the OCSD system would be added to the base rates. This would result in an increase of GCSD's standard services user base with an associated increase in revenue without proportionally increasing treatment and operational

costs. The relatively fixed costs associated with administration, permitting and testing would be spread out among more users, reducing the overall cost for each user. The estimated increase in revenue for standard services would be $380,000 and the estimated increased operation and maintenance cost for GCSD would be approximately $110,000. This results in a net increase in revenue of approximately $270,000. Additionally, GCSD would receive the connection fee payment or the proposed CIP project, depending on a specific negotiated agreement. A connection fee could be used to complete a CIP project or go towards treatment plant upgrades and constructing a CIP project would free up current funds earmarked for that project for other upgrades.

5.1 PREFERRED ALTERNATIVE

The preferred alternative is the alternative that minimizes customer service rates and has the lowest net present worth. It is assumed, for the purposes of selecting a preferred alternative, that capital costs and connection fees will be funded through public grant programs or other non-ratepayer source and will not require financing of costs through customer service rates.

Based on these criteria, the preferred alternative is Pipeline Alternative 1A.

5.1.1 Preferred Alternative Opinion of Probable Construction Cost

Design and construction of the preferred alternative, Pipeline Alternative 1A, is estimated to occur over the next four years and the estimated mid-date of construction is 2026. To properly account for inflation and estimate the probable construction cost of Pipeline Alternative 1A at the mid-date of construction, the construction cost estimate has been escalated to 2026 dollars at a rate of 5 percent per year. The current inflation rate is approximately 8.5 percent, which is not anticipated to be consistent for the next four years, so 5 percent was selected as a reasonable inflation rate over the time period in question.

The opinion of probable construction cost for Pipeline Alternative 1A is $11,440,000.

REFERENCES

[1] Source: OCSD ESD count from OCSD Annual Revenue & Operating Cost Summary.
[2] Source: Occidental County Sanitation District Wastewater Transport Compliance Project Plans
[3] Source: Occidental County Sanitation District Trucking Data Logs for January 2019 through January 2021
[4] Source: NPDES No. CA0023639 Order No. R1-2018-0001
[5] Source: NPDES No. CA0023639 CIWQS Public Records from the North Coast Regional Water Quality Control Board
[6] Source: Occidental Wastewater Transport and Treatment Project Recirculated Initial Study/Proposed Mitigated Negative Declaration. SCH No. 2019119006
[7] Source: OCSD lift station volumes from hydraulic profile provided in the Occidental County Sanitation District Wastewater Transport Compliance project plans.
[8] Source: OCSD treatment plant pond volumes from NPDES No. CA0023051 Order No. R1-2012-0101.
[9] Source: OCSD Average Sewer Data from monthly records from January 2007 through June 2017 provided by Sonoma Water.
[10] Source: Single Family Dwelling Billing Basis and Classified User ESD Calculation Formula from GCSD Ordinance 300 Exhibit A

APPENDIX A – EXHIBIT FROM RECIRCULATED INITIAL STUDY/PROPOSED MITIGATED NEGATIVE DECLARATION (INITIAL STUDY) FOR THE OCCIDENTAL WASTEWATER TRANSPORT AND TREATMENT PROJECT

N

0 10' 20' 40'

PRIVATE DRIVEWAY

(E) SSMH
RIM=217.12
INV=210.37

GREEN VALLEY RD

GRAVENSTEIN HWY N

20'

16'

(N) SSFM

(N) SEWER TRANSPORT UNIT
WITH 12' X 5' CONCRETE PAD

(N) TRAFFIC STRIPING

APPROXIMATE LIMITS OF (N) PAVING/CONCRETE PAD

APPROXIMATE LIMITS OF (E) AC

APPROXIMATE LIMITS OF (E) AC

VAC TRUCK

(E) CULVERT OUTLET

(E) CULVERT

(E) WOOD FENCE

(N) RETAINING WALL

12'

5'

(N) RETAINING WALL

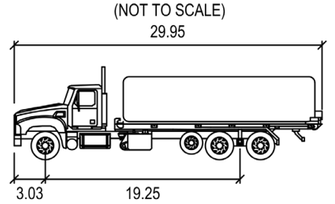
APPROXIMATE LOCATION OF
(E) POWER POLE AND GUY WIRE

(E) WIRE MESH FENCE

NOTE

1. Typical dimensions of vac tank truck are shown below.

(NOT TO SCALE)



VAC TANK TRUCK
TRUCK DRIVEN @ 6MPH
1.0' MIRROR CLEARANCE INCLUDED

		feet
WIDTH	:	7.87
TRACK	:	8.04
LOCK TO LOCK TIME	:	6.0
STEERING ANGLE	:	35.4


View of Existing ALWSZ Receiving Station

GHD

Occidental Wastewater Transport and Treatment Project

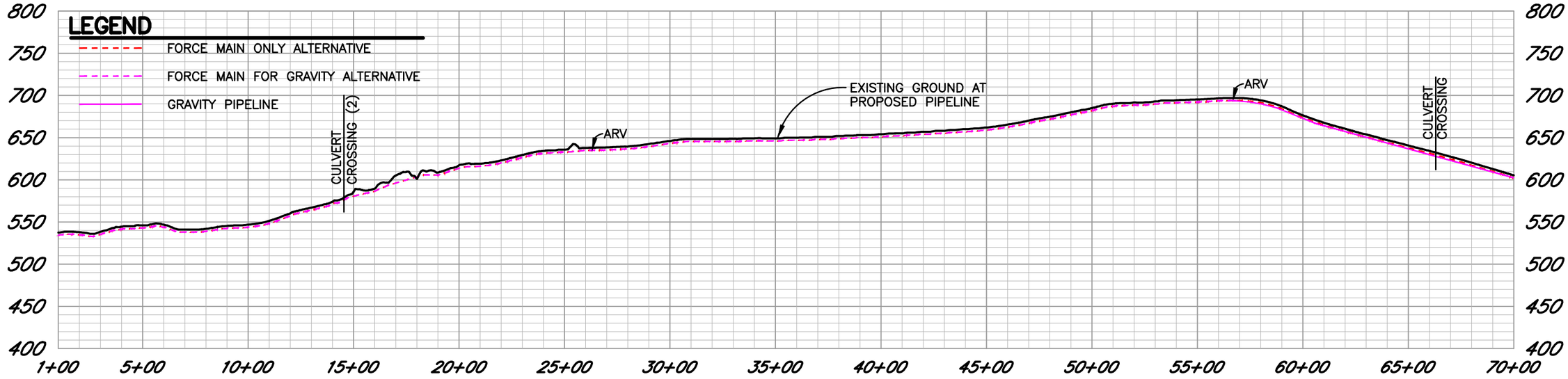
Proposed GCSD Improvements

Project No. 11185760
Revision No.
Date Feb 2021

FIGURE 2

Print date: February 24, 2021 1:35 PM

APPENDIX B – EXHIBITS 1 – 5



PROFILE

SCALE: HORZ. 1"= 500'
VERT. 1"= 125'

SEE EXHIBIT 2

SEE EXHIBIT 2

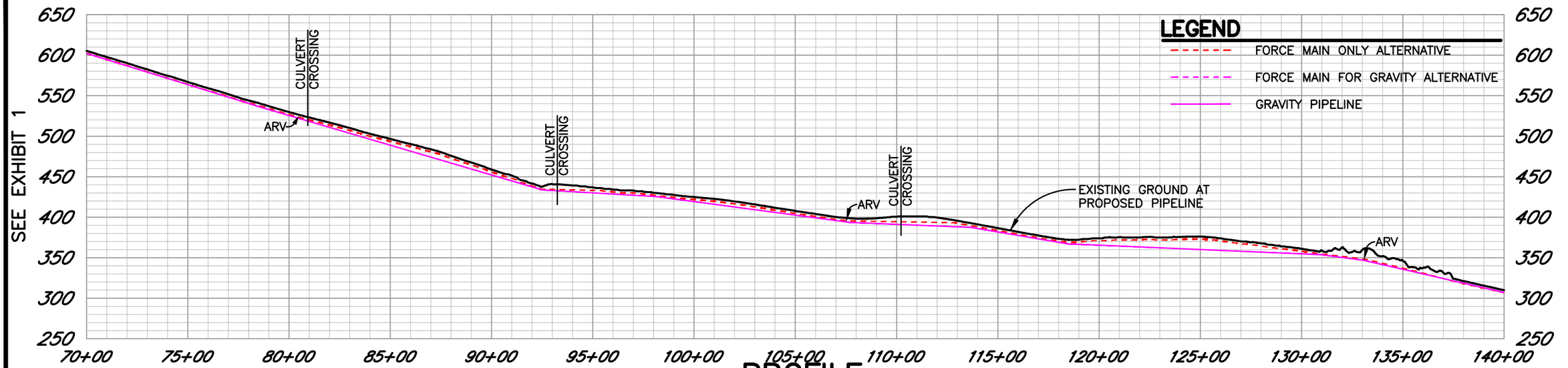
PIPELINE ALTERNATIVE PROPOSED ALIGNMENT - FIGURE 1 OF 4

OCCIDENTAL TO GRATON FEASIBILITY STUDY
JUNE 2022

Brelje & Race CONSULTING ENGINEERS
475 Aviation Blvd.•Suite 120•Santa Rosa, CA 95403•707-576-1322
www.breje.com

EXHIBIT 1

07-21-21 grubb \3619\dwg\3619 09\EXHIBIT\3619.09 EXHIBIT-Feasibility Study.dwg TAB: FIGURE 1



PROFILE

SCALE: HORZ. 1" = 500'
VERT. 1" = 125'

SEE EXHIBIT 1

SEE EXHIBIT 3

SEE EXHIBIT 1

SEE EXHIBIT 3

PIPELINE ALTERNATIVE PROPOSED ALIGNMENT - FIGURE 2 OF 4

OCCIDENTAL TO GRATON FEASIBILITY STUDY

JUNE 2022

EXHIBIT 2

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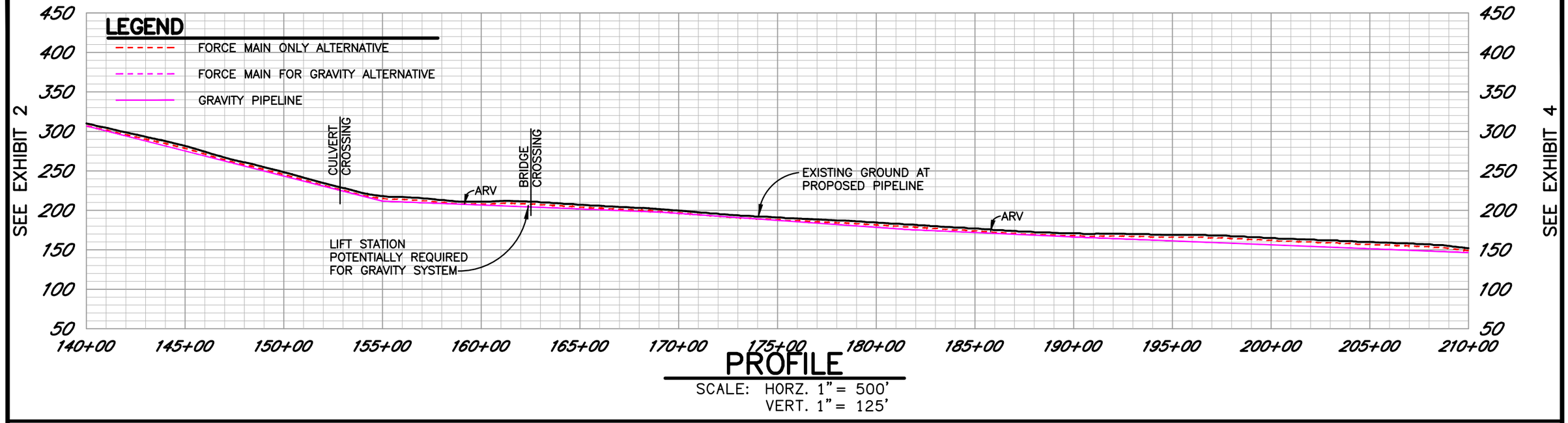
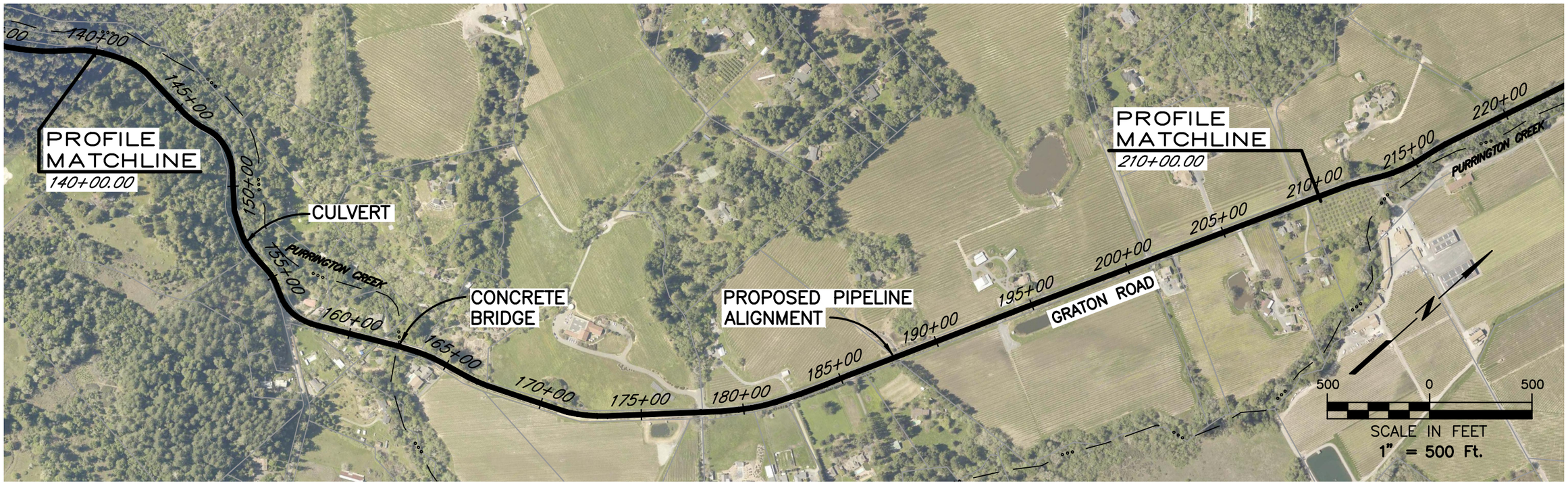
07-21-21 grubb \3619\dwg\3619 09\EXHIBIT\3619.09 EXHIBIT-Feasibility Study.dwg TAB: FIGURE 2



PROFILE

SCALE: HORZ. 1" = 500'
VERT. 1" = 125'



PIPELINE ALTERNATIVE PROPOSED ALIGNMENT - FIGURE 3 OF 4

OCCIDENTAL TO GRATON FEASIBILITY STUDY

JUNE 2022

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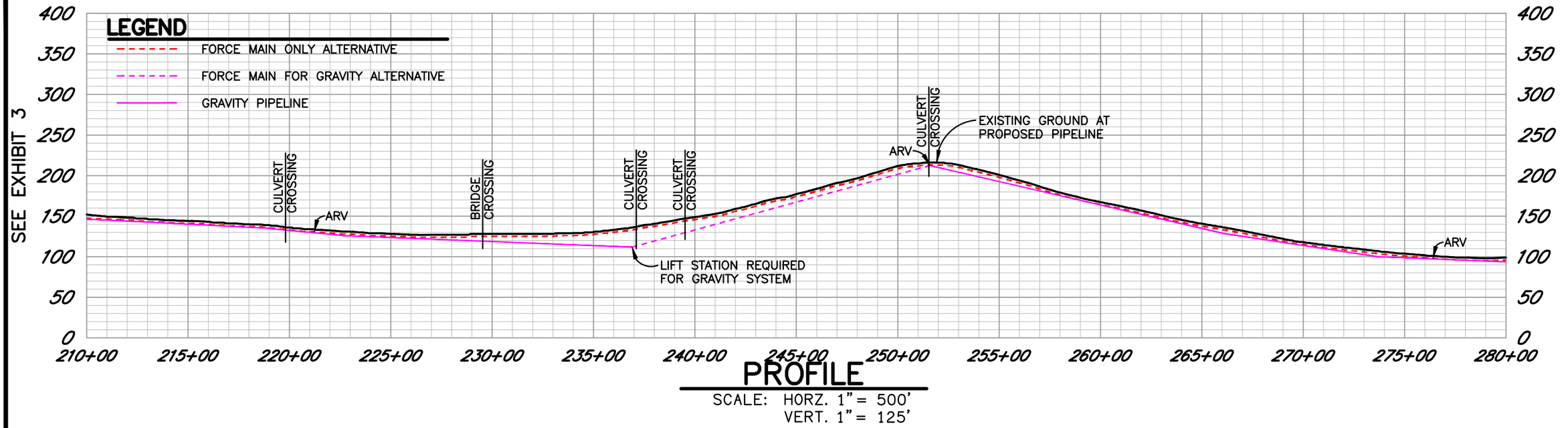
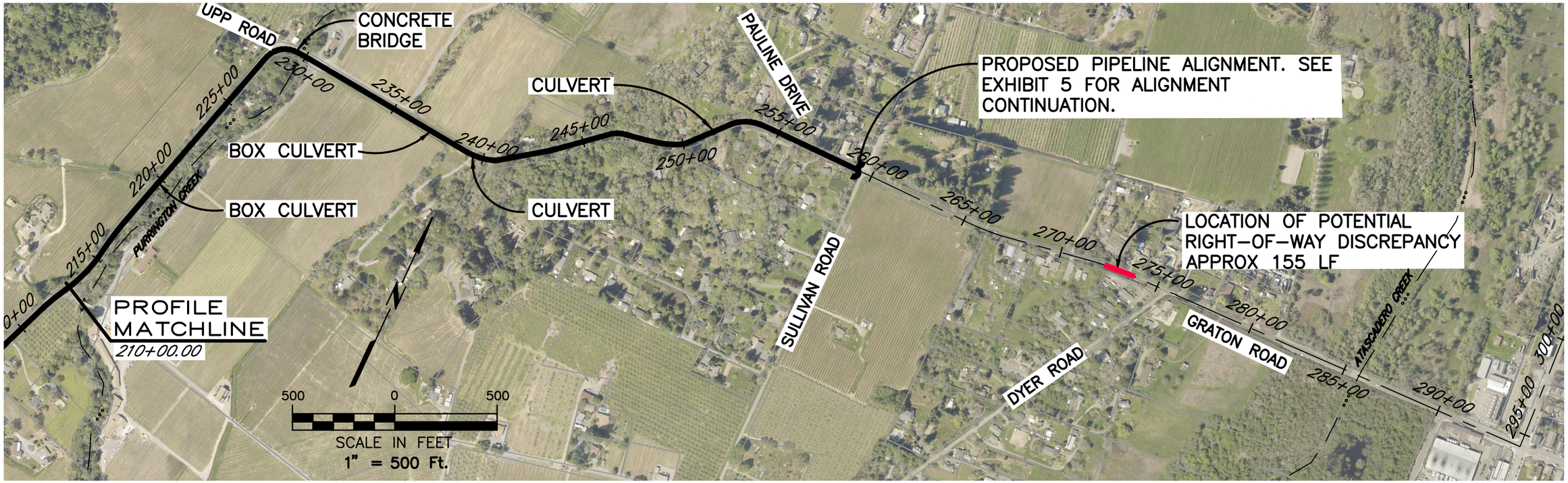
EXHIBIT 3

TAB: FIGURE 3
07-21-21 grubb \3619\dwg\3619 09\EXHIBIT\3619.09 EXHIBIT-Feasibility Study.dwg



PROFILE

SCALE: HORZ. 1" = 500'
VERT. 1" = 125'



PIPELINE ALTERNATIVE PROPOSED ALIGNMENT - FIGURE 4 OF 4

OCCIDENTAL TO GRATON FEASIBILITY STUDY
JUNE 2022

EXHIBIT 4

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PIPELINE FROM OCCIDENTAL (ALL PIPELINE ALIGNMENT ALTERNATIVES)

SULIVAN ROAD

PIPELINE ALIGNMENT ALTERNATIVE 2B

GREEN VALLEY ROAD

ATASCADERO CREEK

GRATON TREATMENT PLANT

WEST COUNTY TRAIL

ROSS ROAD

PIPELINE ALIGNMENT ALTERNATIVES 1A, 1B & 2A

GRATON ROAD

PIPELINE ALIGNMENT ALTERNATIVE 2A (PARALLEL TO EXISTING GRAVITY SEWER ALIGNMENT)

GRATON FM MANHOLE DISCHARGE (MH 3-2)

PIPELINE ALIGNMENT ALTERNATIVE 1A (TERMINATE AT MH 5-10)

ROSS ROAD

PIPELINE ALIGNMENT ALTERNATIVES 1B & 2A

EXISTING GRATON LIFT STATION NO. 1

750' 0 750'

SCALE IN FEET
1" = 750' Ft.

EXHIBIT 5

PIPELINE ALIGNMENT TERMINATION ALTERNATIVES AT GRATON

OCCIDENTAL TO GRATON
FEASIBILITY STUDY

JUNE 2022

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